EQUIPMENT SUPERINTENDENT

The man responsible for the selection, performance and availability of his company's diesel equipment

October 1961

FLEET • CONSTRUCTION • INDUSTRIAL

this month's

EQUIPMENT SUPERINTENDENT

JIM WORMINGTON

Maintenance Supervisor—The Western Company

Formerly diesel power

Announcing new diesel engine with less weight per horsepower

For a truly heavy-duty engine, the new KSV provides unusually high horsepower-to-weight ratio, introducing unusual economies in all kinds of stationary and marine services. Shown above on test, this new Cooper-Bessemer 4-cycle engine has proved extremely rugged in continuous operation. It has completed two years of development testing and is now available in 12 and 16 cylinder designs, in spark-ignited gas, diesel, dual-fuel and tri-fuel types . . . for 2960-4280 bhp, 450-514 rpm service.

The high horsepower-to-weight advantage of the KSV results from unique design features including large bore-stroke ratio and short pistons, with relatively high rpm.

Call the nearest office for further information or write The Cooper-Bessemer Corporation, Mt. Vernon, Ohio.

Cooper Bessemer

GENERAL OFFICES: MOUNT VERNON, OHIO

COMPRESSORS · RECIPROCATING AND CENTRIFUGAL
ENGINES · GAS · DIESEL · DUAL FUEL
JET-POWERED GAS TURBINES

For information write in No. 1001

When a Midwestern power cooperative won the REA Diesel Progress Award, the engineers were properly proud. And so was Sinclair—because these engineers had selected Sinclair RUBILENE® HD 40, a diesel lubricating oil, to keep their diesels running without breakdown.

Experience proves that Sinclair RUBILENE is superior under rugged load carrying conditions. Wear is lessened, operation more economical. Chances are your diesels, too, will run better at less cost with Sinclair lubricants. Call your local representative or write...

Sinclair

SINCLAIR REFINING COMPANY

TECHNICAL SERVICE DIVISION • 600 FIFTH AVE., NEW YORK 20, N. Y.

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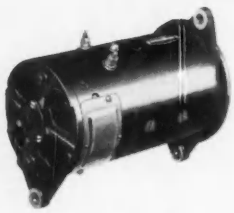
KEEP YOUR OFF-THE-ROAD



HEAVY-DUTY, LONG-LIFE D.C. GENERATOR

- Double-length, double-life brushes with constant-tension springs
- Ball bearings with sealed grease reservoirs—need no lubrication between engine overhauls
- 50-ampere maximum output—available with 10-ampere output at engine idle
- Sealed field coils—impervious to moisture and corrosion

SELF-RECTIFYING A.C. GENERATOR

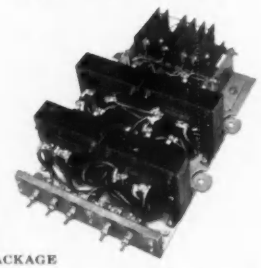
- Built-in silicon diodes eliminate external rectifier
- 30-ampere output at normal engine idle
- 60- or 85-ampere maximum output models available
- Ball bearings with sealed grease reservoirs—need no lubrication between engine overhauls

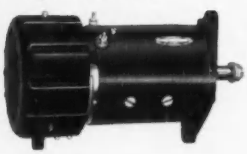
EXTRA-HIGH-OUTPUT A.C. GENERATOR

- 130-ampere maximum output
- 40 amperes at engine idle
- Three-phase a.c. voltage available—ideal for 120-volt conversion as a power source for mobile d.c. power equipment
- Ball bearings with sealed grease reservoirs—need no lubrication between engine overhauls

FAN AND SHROUD ENCLOSED D.C. GENERATORS

- Totally enclosed for protection against foreign materials
- 12-volt—24- and 40-ampere maximum outputs. 24-volt—15- and 20-ampere maximum output generators available
- Double-life brushes and constant-tension brush springs
- Ball bearings with sealed grease reservoirs—need no lubrication between engine overhauls





POWER SUPPLY PACKAGE

- Rectifies and transforms vehicle generator voltage up to 120 volts d.c.
- Furnishes dependable power up to 1200 watts
- Provides mobile power suitable for incandescent lights, universal motors, d.c. motors, a.c.-d.c. radios, resistive loads without thermostats, or other 120-volt d.c. equipment

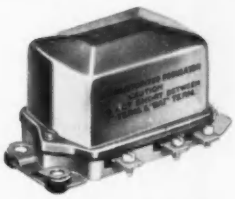
SPECIFY DELCO-REMY POWER-MATCHED ELECTRICAL SYSTEMS!

It's the sure way to prevent downtime and costly repairs caused by inadequate electrical systems. With Delco-Remy's broad line of complete systems and individual components, you can match electrical power exactly to the special needs of your equipment. New design concepts and construction features mean Delco-Remy units last longer, require little or no periodic servicing and deliver more dependable operation under *all* conditions. The particular Delco-Remy system that'll prove

EQUIPMENT ON THE JOB . . .

DOUBLE CONTACT GENERATOR REGULATOR

- Double contacts provide better voltage control—longer service life
- Simplified external adjustment feature quickly tailors voltage to job
- Waterproofing insures long life and reliable operation

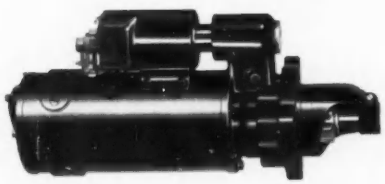


TRANSISTORIZED REGULATOR

- Vibrating type voltage sensor plus single transistor extends service life
- Accurate voltage control at all generator speeds
- Available with simplified external voltage adjustment feature
- Available for either indicator light or ammeter circuits

FULL-TRANSISTOR REGULATOR

- No moving parts to wear out
- Requires no periodic servicing
- Constant voltage control—unaffected by temperature changes, vibration or mounting position
- Simplified external adjustment feature—permits tailoring voltage to operating conditions



HIGH-DUTY CRANKING MOTOR

- New high-performance 12-v. motor eliminates need for series parallel switch circuits with no increase in battery capacity—24- and 32-volt models also available
- Two-piece housing permits 24 different solenoid positions, reduces number of models and spare parts needed
- Totally enclosed drive shifting mechanism is protected against dirt, water, slush and ice
- Heavy-duty sprag clutch remains engaged until engine starts—improves cold weather starting

DC-250 HIGH-DUTY BATTERIES

- Glass mat retainers protect positive plate material—improve cycling ability, provide longer service life
- Resin seals between cell cover and terminal and between case and cell cover protect plates and separators from vibration damage and prevent electrolyte loss
- Newly formulated positive plate material withstands vibration and cycling damage—delivers dependable power during longer life span of DC-250

most economical for your needs depends on your equipment's job and its performance requirements. Ask your dealer about Delco-Remy power-matched electrical systems and specify them when ordering new vehicles. And, to bring your present equipment up to date, contact your United Delco Distributor.

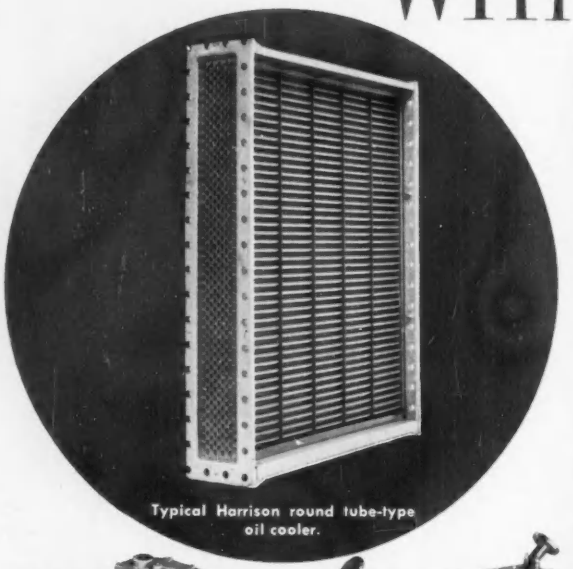
Delco Remy

DELCO-REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

For information write in No. 1003

General Motors Reliability in Action...

COAL AUGER BORES DEEP WITH COOL POWER



Typical Harrison round tube-type oil cooler.

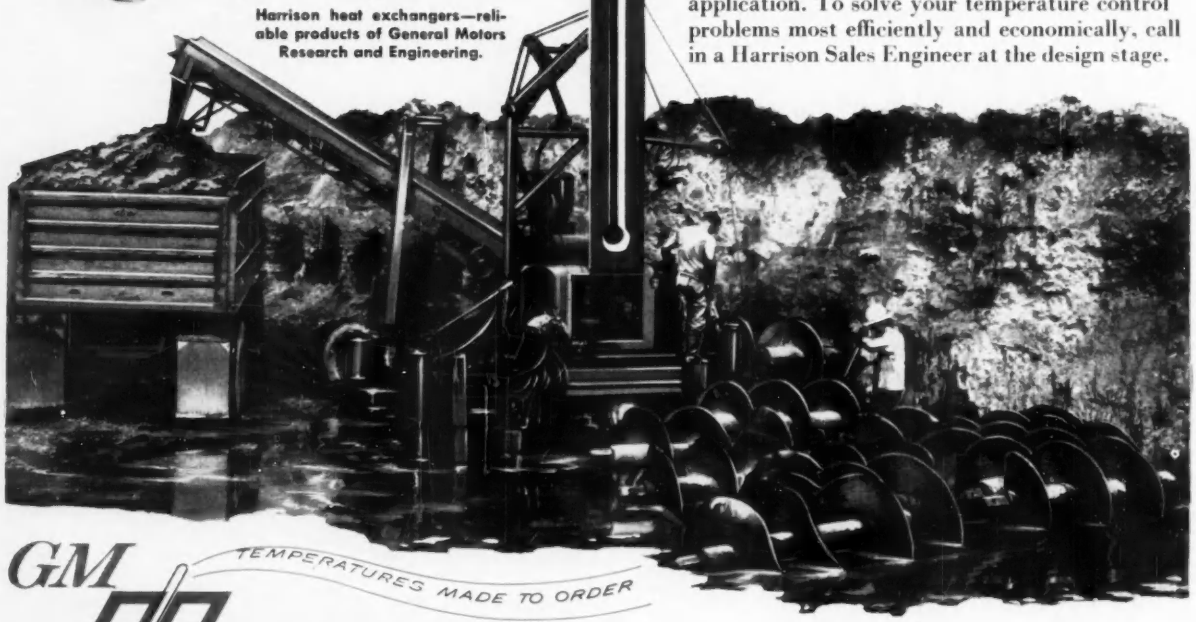
Harrison heat exchangers—reliable products of General Motors Research and Engineering.

GM HARRISON OIL COOLERS PERFORM RELIABLY IN TOUGH DIESEL-POWERED MINING OPERATION

When rock and earth overburden becomes too great for economical coal-stripping in this Ohio mine, an ingenious auger works in a deep trench to "bore" out the coal.

For this rugged job, a GM Diesel engine supplies the power. And a Harrison heat exchanger—built under the most rigorous standards of reliability—keeps the engine oil cool. This reliability—"measurable excellence"—is accurately maintained by a system of scientific controls that cover every phase of product design, development and production. Result: Harrison heat transfer products that perform their functions exactly *right*.

You can get this Harrison reliability in a wide range of basic types of heat transfer construction—a complete line of designs which assures the *right* heat exchanger for every application. To solve your temperature control problems most efficiently and economically, call in a Harrison Sales Engineer at the design stage.



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AIRCRAFT, AUTOMOTIVE, MARINE AND INDUSTRIAL HEAT EXCHANGERS

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HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK

For information write in No. 1004

FORMERLY DIESEL POWER

EQUIPMENT SUPERINTENDENT

The man responsible for the selection, performance and maintenance of his company's diesel equipment

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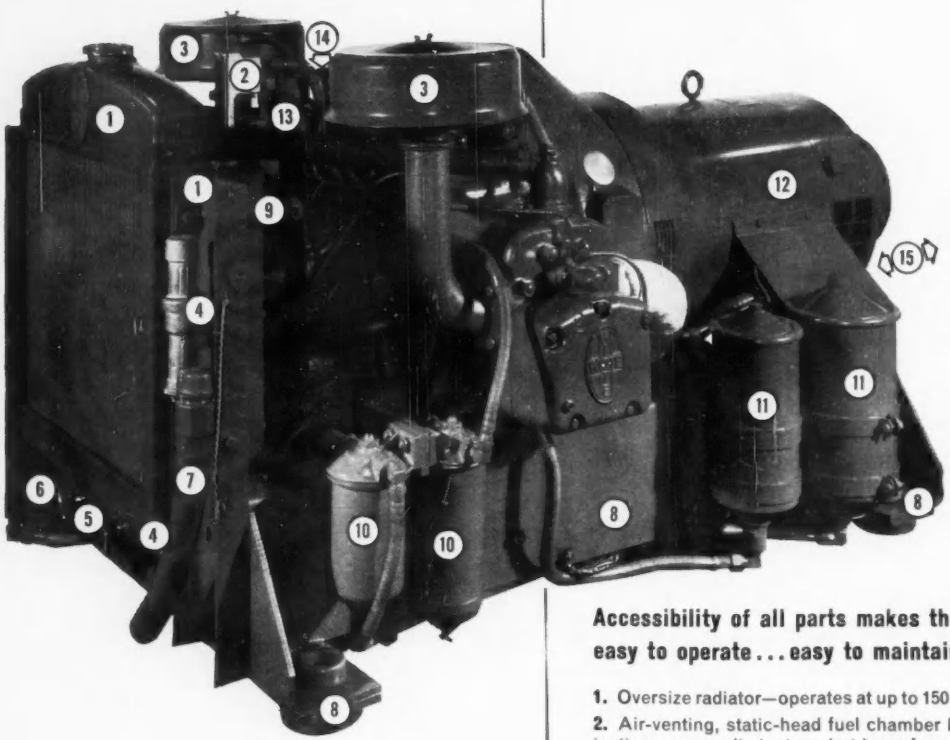
Witte Diesel Engine-Generator Units are Built Low, Time-Tested and Packed with Endurance



Especially built for demanding refrigeration service, the Witte Models 100RDA, 12½ KW, and 120RDA, 17½ KW Diesel Engine-Generator Units have 60 cycle-40 cycle brushless generators and Witte two-cylinder, horizontally opposed, 4 cycle Diesel Engines.

The Railway Mechanical Refrigeration Industry is relatively new . . . yet Witte has been active as a power supplier in the field for over five years. Repeat orders from users attest to built-in quality and reliable performance. These fine railroad units are backed by a world-known organization.

Witte . . . noted for long-lived, continuous-running engines . . . is continually proving the capability of these railway units in mechanical refrigeration applications—where only a "live" engine is an acceptable one.

USS and Witte are registered trademarks

Witte Engine Works
Oil Well Supply
Division of
United States Steel

1615 Oakland Avenue, Kansas City 26, Missouri

Accessibility of all parts makes the Witte easy to operate . . . easy to maintain.

1. Oversize radiator—operates at up to 150°F. ambient.

2. Air-venting, static-head fuel chamber built into injection pump—eliminates shutdown from air leaks in car's fuel system.

3. Dry type air cleaners—quickly and easily serviced.

4. Ether injection system—for cold starting.

5. Starting control (one lever provides all starting functions).

6. Stop control.

7. Extra length, lube-oil, dump hose—completely drains sump.

8. Extra-heavy, rigid, skid-support with oversize shock mounts.

9. Two-speed engine control (1800 rpm—"pull-down" speed) for maximum fuel economy (1200 rpm—"holding" speed) Thermostat actuated.

10. Primary and secondary fuel filters.

11. Bypass, Full Flow lube oil filters—1200 hr. change period.

12. 12½ KW and 17½ KW (continuous ratings) brushless generators—operate at 60 cycles ("pull-down") 40 cycles ("holding").

13. Mechanical, safety shutdown—built into injection pump.

14. Load Compensator Switch—extends the functioning of the mechanical safety control to meet abnormal, transient temperature conditions.

15. Center-of-Mass of the Witte unit is less than 16 inches off the car floor—optimum installation to handle car humps, shocks and over-the-road vibration.

All accessories are readily accessible.

For information write in No. 1005

Put the power where the plow is

New IH turbocharged diesel has Ni-Resist* top groove piston ring inserts that cut power-wasting "blow-by". . . reduce oil consumption.

Pulling a 40-foot chisel plow with rod weeder attachment, this 300 hp. International Harvester model 4300 diesel tractor can work 30 acres an hour – at a fuel cost of just six cents per acre.

Efficient turbocharging is one reason for this tractor's cost-cutting economy. And because turbo-charging requires high operating temperatures, IH engineers specify Ni-Resist nickel-alloyed austenitic cast iron for critical engine parts:

Top groove piston ring inserts are of Type I Ni-Resist iron to provide strength and wear resistance inside the cylinders. Because Ni-Resist inserts don't pound out of shape in modern, high-compression engines, they prevent power-wasting blow-by and needless oil consumption.

The turbocharger casing is made of Type D-3 ductile Ni-Resist iron. This Ni-Resist iron withstands temperatures up to 1400° F . . . resists warping and corrosive exhaust gases that tend to form energy-robbing scale.

When you build, buy or use heavy-duty diesels, specify Ni-Resist irons for parts exposed to extreme wear, high temperatures, and conditions that cause warpage and scaling. For more information about Ni-Resist irons, write to:

*Registered trademark

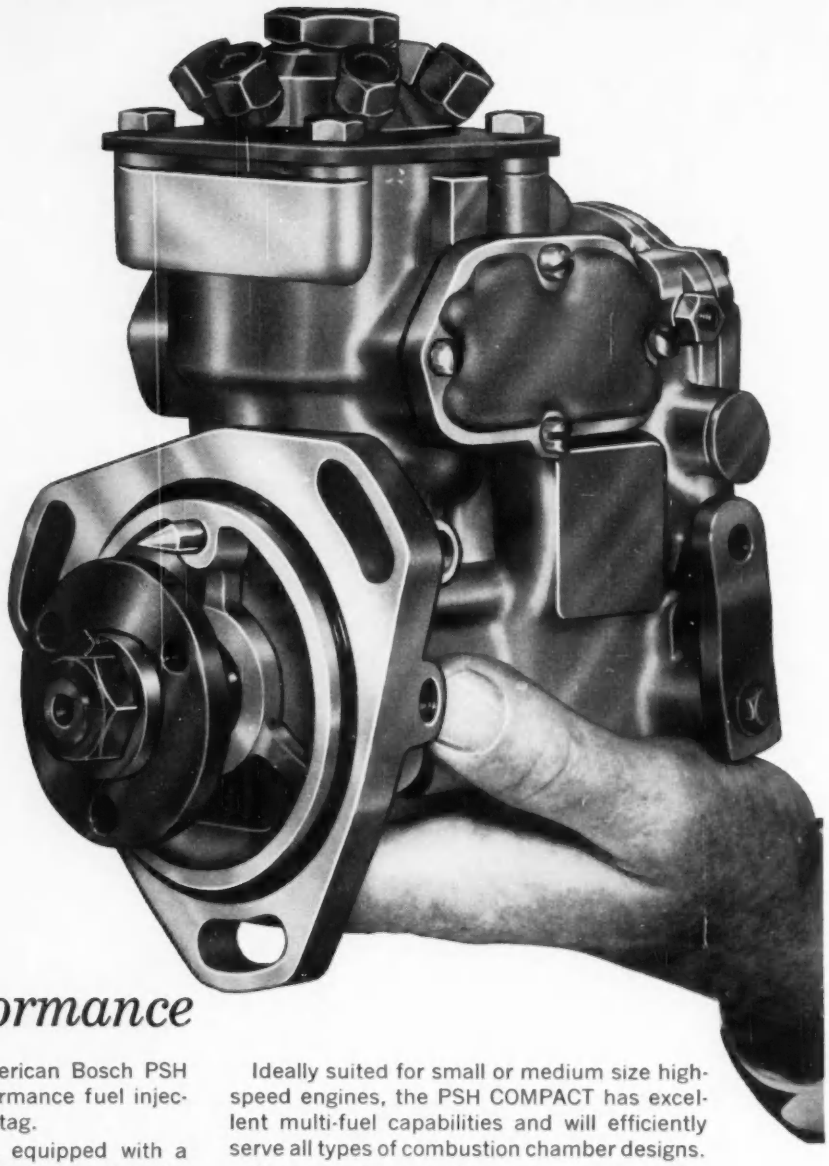
THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street INCO New York 5, N. Y.

NI-RESIST

NICKEL-ALLOYED IRONS PERFORM BETTER LONGER

Great new things are coming from AMERICAN BOSCH!



NEW COMPACT DESIGN

top pump performance

You're looking at the American Bosch PSH COMPACT—the HIGH performance fuel injection pump with a LOW price tag.

Here's a compact pump, equipped with a governor and supply pump, that is simple in design, light in weight, with fewer parts . . . yet, the PSH COMPACT retains the proved features and superior injection characteristics of other American Bosch distributor-type pumps.

Ideally suited for small or medium size high-speed engines, the PSH COMPACT has excellent multi-fuel capabilities and will efficiently serve all types of combustion chamber designs.

If you want top performance and dependability in fuel injection, in an economical price range, it will pay you to specify the American Bosch PSH COMPACT. It's today's big value in fuel injection. Ask for complete details. B441

MOVE AHEAD with AB

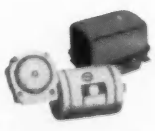
AMERICAN BOSCH ARMA CORPORATION

Commercial Sales Division • Springfield, Massachusetts

Diesel Fuel Injection Systems

Ensign Carburetion

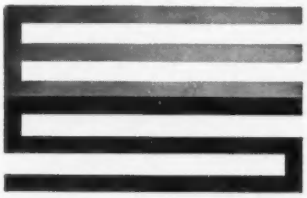
Hydraulic Cranking Systems and Accumulators



Automotive Electrical Equipment

Magnetos and Ignition Equipment

For information write in No. 1006



EDITORIALLY SPEAKING

A matter of trust . . .

As consumers, we're all targets for gigantic sales efforts. A flood of motivation researchers dig into our conscious and even sub-conscious reaction to find out what makes us buy or not buy . . . to find our basis for selection. Read the jargon and you'll find motivation terms such as "fear", "guilt", or "cupidity". They speak of identification with the "father image", the "sex symbol" or "prestige symbol". It almost seems that the product is secondary; the image you convey is the thing. A comment reported from the footwear industry is, "You don't sell shoes; you sell beautiful feet!" The thing works like a virus . . . in time you become immune or you succumb. Mind you, we're not knocking it; it seems to work. Some ideas might be carried over into our more prosaic industry. There's always room for better "sell" psychology. But there is a limit and there should be a change of emphasis. It's hard to sell a bulldozer as a sex or prestige symbol. We'd like to see emphasis on such terms as "quality" and "trust"; more use of the industry's real "buy" motivations such as "lower operating costs", "improved performance" and "longer life". In short, let's get down to basic values. Actually, it's the customer who determines the way business is done. If he's a non-discriminating "price" buyer or resists (perhaps as a conditioned reflex from consumer "hard sell") constructive sales efforts to give him what he needs, the sellers have to play his game. Here's an actual case. A man made the rounds of truck dealers making it plain that he was buying on price. A dealer quoted him on a standard unit and eventually got the sale. However, knowing the customer's service, he told him that the standard electrical equipment would not be adequate and suggested a little extra investment in heavier-duty equipment. No sale. Three months later the customer was back for the heavier-duty equipment. Now, the cost as a replacement was considerably higher. Over the customer's screams, the dealer reminded him of his earlier suggestion. Then came the classic comment, "Why didn't you insist!". The man forgot that he'd called the play and the dealer had to go along . . . or lose a sale. By and large, the customers can have the kind of business climate they want. They can have a merchandising jungle where they have to protect themselves continually . . . or they can have a clean, ethical market in which business is based on mutual trust. What'll it be?

B.P.E.

Alnor Pre-Turbocharger Excess Temperature Alarm

measures the exhaust temperature as it enters the Turbocharger

Prevents overheating of the turbocharger by sounding an alarm if exhaust exceeds the set safe temperature.

The Alnor Pyrotac with a temperature range up to 2000° is employed in this alarm system and is actuated by a thermocouple inserted in the exhaust pipe at the entrance to the turbocharger.

If the exhaust temperature reaches the danger point and the alarm is sounded it is necessary to manually reset the Pyrotac thus making it impossible for the operator to ignore the danger signal.

This alarm system is inexpensive to install, 100% reliable and offers full protection for the turbocharger.

This Pyrotac is the same sensitive, rugged instrument now used extensively on most Diesel installations for checking the efficient operation of the power plant by monitoring the exhaust temperature of each cylinder.

Alnor has specialized on diesel malfunction alarm systems since 1926.

Alnor INSTRUMENTS

ALNOR INSTRUMENT CO.

Division of **Illinois Testing Laboratories, Inc.**

Room 507 • 420 North La Salle Street • Chicago 10, Illinois

For information write in No. 1007

HIGHLIGHTS

FROZEN FOOD INDUSTRY IS PRIME DIESEL ENGINE SALES TARGET

Let's look at the growth of this industry . . . Today there are 6000 railway reefer cars against three (3) in '48. Truck reefer trailers are being built at the rate of 4000 per year. Public warehouse space has more than tripled since '45 . . . With the self-imposed zero-degree standards of the industry, higher refrigeration requirements dictates use of diesels in reefer cars and trailers, and reliability makes their use less expensive in the long run . . . And, considering the huge loss created by power failure, warehouses are good prospects for standby power protection . . . New sales prospects keep popping up.

FORD OFFERS BRAZIL-MADE DIESEL ENGINES

Ford Motor Company is offering Brazilian-made Perkins diesel engines as optional first equipment in their F-600 trucks in Brazil . . . Engines are made by Motores Perkins S.A., of Sao Paulo.

P-I-E FILM TO BE SHOWN IN RUSSIA

Pacific Intermountain Express was notified by the U.S. Information Agency that its film "Wheels of Progress" is among those to be shown on U.S. transportation to business and industrial audiences in Russia.

SOME OPERATORS JUST REFUSE TO LEARN

Any operator knows that a properly-maintained and properly-operated diesel does not smoke. He also knows that a "smoker" is costing him money . . . Nonetheless, since '54, 8000 citations have been issued to diesel truck operators in Los Angeles County for excessive smoke . . . Apparently, county officials feel that any operator who can afford to operate that inefficiently can stand the additional tariff.

MORE FUNDS AVAILABLE FOR SEWAGE TREATMENT PLANTS

Federal funds are now available to communities for building sewage treatment plants, if the governor of the state asks for them . . . Congress has approved $80 million for this year, $90 million for fiscal '63, and $100 million in each subsequent year . . . Federal funds available to an individual community for a single project are increased to $600,000 . . . Old limit was $250,000.

INDIA CONSIDERING DIESEL LOCOMOTIVE MANUFACTURE

The Railway Ministry is considering a proposal to establish a diesel locomotive manufacturing factory . . . India's requirements for the next few years are projected at 500 diesel locomotives. Some of these would be manufactured at the new facility, while the remainder would be imported . . . Seven W. German units are now on trial.

FOUR STATES AGREE TO REIMBURSE UTILITIES

Alaska, Geogia, Indiana and Tennessee have agreed to reimburse utilities for the cost of relocating their facilities when necessiated by highway construction . . . Sensible way to keep it going.

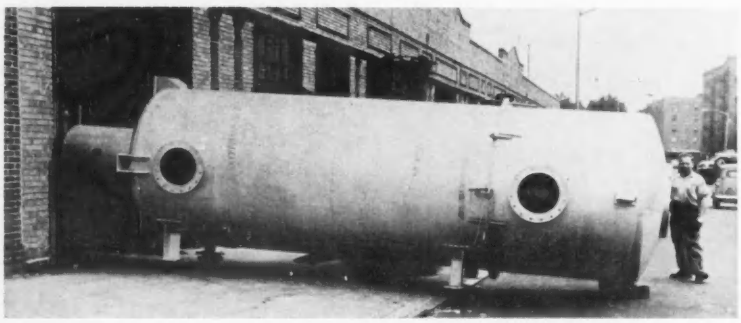
MOPAC BUYS 50 EMD LOCOMOTIVES

The Missouri Pacific Railroad has signed a $9 million contract with EMD or 50 1800-hp general-purpose diesel locomotives.

NEWS SECTION

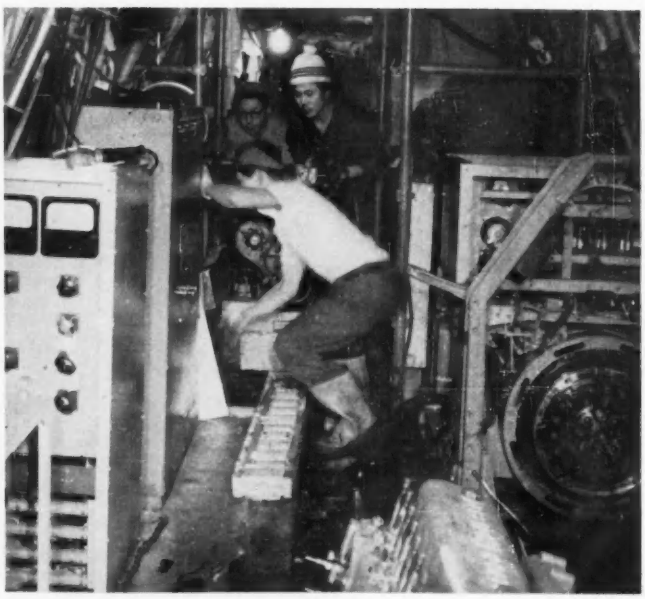
Report on Repowering

Furniture Company of Talapossa (Georgia) reports on the performance of a repowered van unit. Estimated overall savings could reach $1300 per year. Also reported is consistantly faster trip times. Truck moves payloads up to 14,000 lbs transporting raw materials and finished furniture. Engine is GM 4-53 130-hp diesel.



A Rather Large Muffler

One of the largest mufflers ever built begins its journey from Industrial Acoustics Co. to Bermuda Electric Light Co., Ltd. It will silence a 12-cyl 9000-hp Nordberg to 18 decibels, made to handle 38,000 cfm @ 475°.



No Starting Problems

Japanese crew returning to their Antarctic base after an absence of one year found things pretty much as they left them. One of the first projects was to start up the diesels they had left in place. These Isuzu engines power generators and snow cars, had been left in place in −100°F temperatures. The Isuzu diesels started right up with normal cranking, without starting fluid.

Fleet Exposition This Month

The 1961 Fleet Maintenance Exposition is just about here—the New York Coliseum, October 23-26. Get there if you can. It's sponsored by the Private Truck Council of America, will feature a technical program of workshops and seminars on maintenance problems and procedures experienced by the nation's private and for-hire motor fleets.

National Conference on Industrial Hydraulics

Illinois Institute of Technology, in cooperation with 11 engineering societies, is sponsoring the 17th Annual National Conference on Industrial Hydraulics, to be held Oct. 19-20 at the Sherman Hotel, Chicago. If you miss the meeting, papers are available from Illinois Institute of Technology.

LeT & Westinghouse Brake Complete Agreement

LeTourneau - Westinghouse announced conclusion of an agreement with Westinghouse Air Brake Company to provide consulting services to their divisions and subsidiaries in planning long-range broad-scope government marketing operations, stressing combined resources and capabilities. A new corporate Government Project Service Council will be established in the Washington area.

Ceylon Gets Two More Diesel-Electric Locomotives

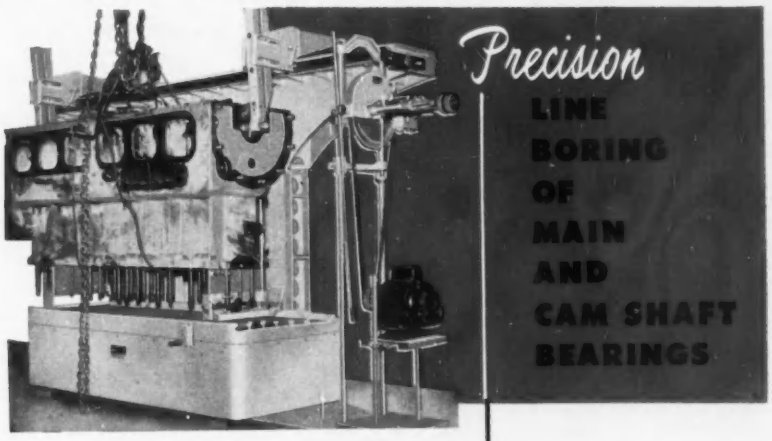
Ceylon was the recipient of two additional diesel-electric locomotives, bringing to 12 the number of GM locomotives operated by the Ceylon Government Railways. The other ten were donated by Canada under the Colombo Plan. Built by General Motors Diesel Limited, of Canada, the locomotives are known as the model G12, are the type designed by GM for universal application on the world's railways. Rated 1310-hp, they have two motor three-axle trucks designed for the 66-in. broad-gauge track in Ceylon. These fully flexible trucks are used to reduce axle loading as the center axle is used for load carrying only.

Engineers Learn Computer Operation

Engineers attending the 17th Annual National Electronics Conference in Chicago's International Amphitheater have the opportunity of learning to use modern digital computer systems. These are becoming a larger and larger part of the engineer's job function.

It's Really Simms Fuel Injection

In our May issue we stated that the GM Bedford diesel line being distributed in Canada was fitted with C.A.V. injection. We have been advised that this is only partially correct. The Bedford 300 uses the C.A.V. system, but the equipment fitted to the Bedford 200 is the Simms fuel injection system.



with a **TOBIN-ARP** *Precision Engineered*
LINE BORING MACHINE

Precision centering with dial indicator to *positively* restore original center line of main and cam shaft bearing bores in warped or worn engines. Both models offer heavy duty capacity to bore Bearing Saddles in crank case castings for precision or plated bearings. Equipped with motor drive and hydraulic feed, a TAMCO Line Boring Machine will accomplish the largest or the smallest job (within range) with equal ease and accuracy.

MODEL TA-15 (shown above)
CAPACITY: Will handle engines with 96" overall spread of main or cam bearings. 20" side of crankcase to main bearing center line. 42" from table to bearing line. Wt. 1500 lbs. Shipping Wt. Domestic 1900.

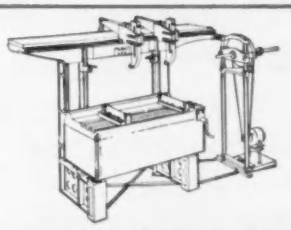
DIMENSIONS: Height 65", width 36", length 118". Add 3 ft. to length for minimum operating space.

TOBIN-ARP MFG. CO.
6400 PENN AVENUE SOUTH
MINNEAPOLIS 23, MINNESOTA

A TAMCO PRODUCT

MODEL TA-14
CAPACITY: Will handle engines with 72" overall spread of main or cam bearings. 16" side of crankcase to main bearing center line. 32" from table to bearing line. Weight 1200 lbs. Shipping weight Domestic 1500.

DIMENSIONS: Height 55", width 32", length 93". Add 3 ft. to length for minimum operating space.



For information write in No. 1008

Contract to be Awarded for Building 290 LARCs

Representatives from 35 major U.S. and Canadian manufacturers gathered at the U.S. Army Transportation Materiel Command in St. Louis for a pre-solicitation conference for the production of the Army's new 5-ton amphibious lighter, the LARC.

This will be the second contract on the LARC. First was for production of 230 units, totaled $9 million, was awarded to LeTourneau-Westinghouse. This second contract will be for production of 290 units.

Larc has been modified slightly between contracts, and will be powered by a diesel engine rather than gasoline.

Deutz Activity Up

Diesel Energy Corp. announced the latest sales and production figures of its parent company, Kloeckner-Humboldt-Deutz A. G. During the past fiscal year export sales accounted for 36% of total sales. Engine production was at an all-time high with 79,447 diesel engines produced representing 4,703,987-hp. Tractor sales were up 17% and exports of the Magirus (truck) division were increased by 22%.

Mexican and U.S. Truck & Bus Reps to Meet

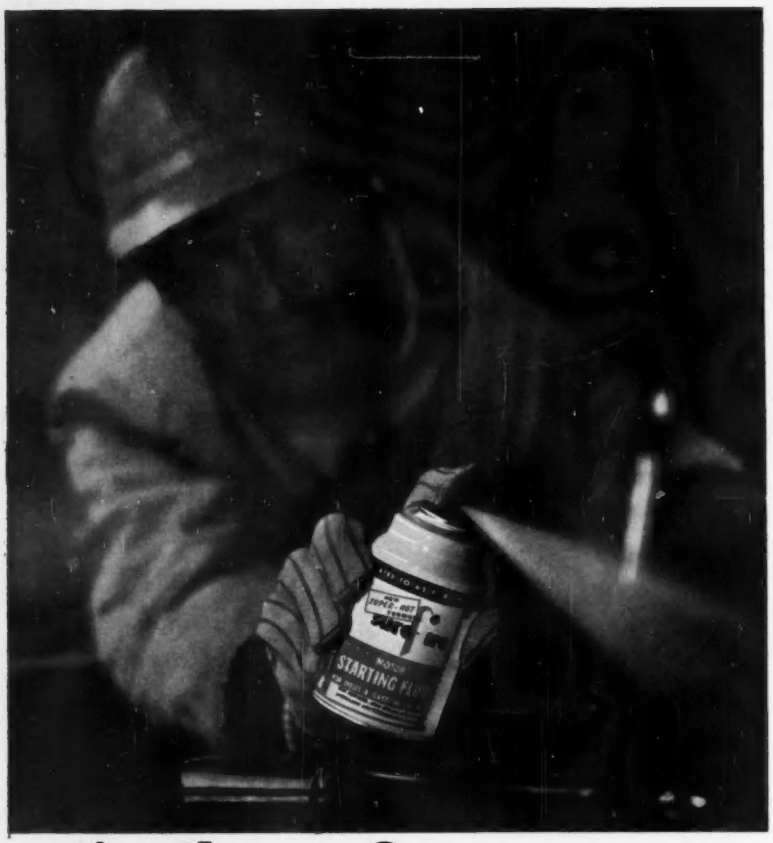
Mexican and U.S. truck and bus representatives will meet at the Hotel Reforma, Mexico City, October 19-20 on the proposed international agreement on commercial motor vehicle traffic on the Pan American Highway System. A similar meeting was held last February, but no decisions were reached. It is hoped that the current meeting will reach definite mutual recommendations. This is of prime interest to truckers who are interested in operating in Mexico.

Detection System Promises Longer Valve Spring Life

A new production capability, designed to improve the quality of engine valve springs and other high-performance springs, has been installed by Associated Spring Corporation at their B-G-R Division. Works by applying high-speed flaw inspection of ferromagnetic spring wire on a production basis. The new equipment uses a specially adapted eddy-current detection technique.

Enterprise Admitted to ADS

Enterprise Engines, Division of General Metals Corp., has become the first engine manufacturer to be admitted to the Association of Diesel Specialists. In the affiliation with ADS, Enterprise will furnish association members with up-to-date specifications and service information on its engines. The Association's members will continue to provide the proper timing application and service for the equipment they repair.



notice the can? It's Wilco's fantastic liquid spray that starts any engine...diesel, gasoline, power mower, outboard motor... in 4 seconds! Even in 65° below zero weather. Saves batteries, engines, ignition systems for just a "penny a start." Highest **repeat sales** record of any automotive product in nation. Have you got →

Ask your jobber or write Wilco, Inc., 4425 Bandini Blvd., L.A., Calif.

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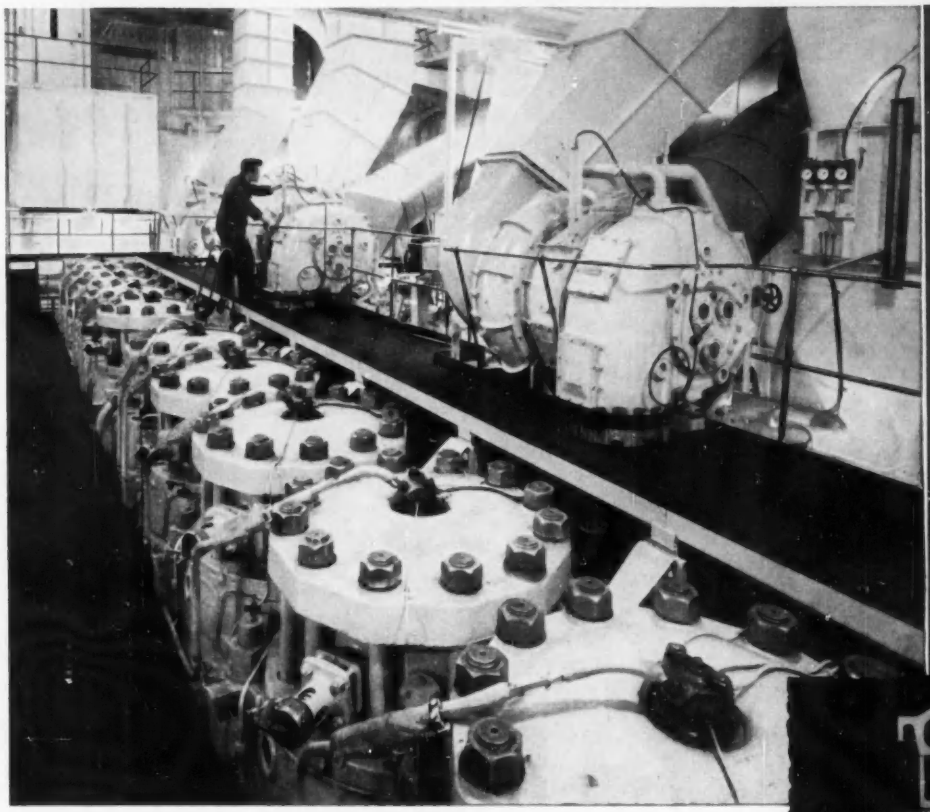

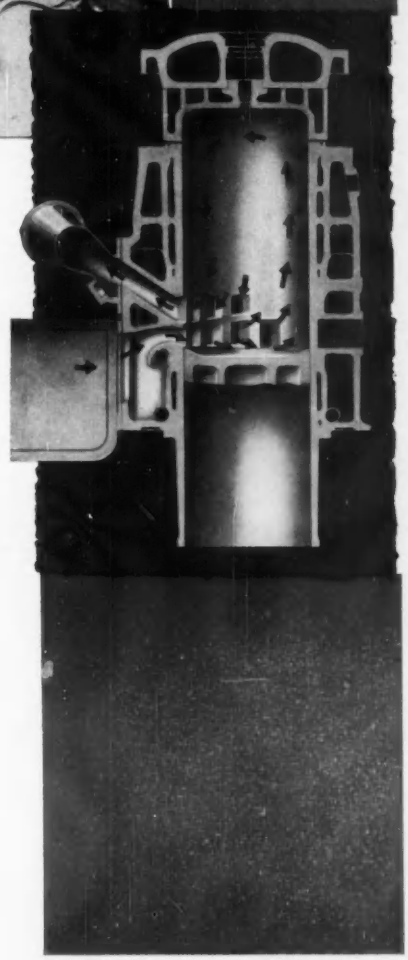

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High Scavenging Effect but Simple Design and Little Maintenance

Exhaust ports controlled only by the main piston · No exhaust valves or other discharge devices · Turbocharged engines without rotary exhaust valves · Simple cylinder covers without any big recesses · Injection valve arranged centrally in the cylinder · Scavenge air and exhaust pipes on the exhaust side, thus ease of access on the control side.

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For information write in No. 1010

PEOPLE, PLANTS, PLACES

Chicago Pneumatic Names General Sales Manager

The **Chicago Pneumatic Tool Co.** has announced the appointment of **Russell B. Miller** to the position general sales manager. His offices will be at the New York general offices.

Russ Miller

Dana Corp. Names General Sales Mgr.

Dana Corporation has appointed **W. H. Schomburg, Jr.** to the position general sales manager. At the same time, **John P. Henson** was appointed assistant general sales manager.

Commercial Filters Completes Consolidation

Commercial Filters Corp. has completed the consolidation of all administrative functions pertaining to Fulflo, Honan-Crane, Delpark and Michiana lines, at Melrose, Mass. Consolidation has involved relocation of only administrative, sales and engineering personnel from the company's Indiana plants, formerly operated under the name Indiana Commercial Filters. No plans have been advanced for moving the manufacturing facilities, and product will continue to be shipped from the Indiana plants.

Gould VP Now Heads Wholesaling Firm

F. H. Harris, who recently resigned as vice-president, sales, engine parts division, **Gould National Batteries, Inc.,** will now actively head his own automotive battery and engine parts wholesaling firm in Memphis. The company, formerly named Battery Warehouse, Inc., has been renamed **Battery & Parts Warehouse, Inc.** It will distribute the Gould National battery line and warehouse Pedrick piston rings, Superior-Arrowhead engine parts and filters, as well as allied parts.

New Federal-Mogul VP

John E. Brennan has joined **Federal-Mogul-Bower Bearings, Inc.** as a vice president of the corporation and general manager of the international division. He was formerly a VP of Chrysler Corp.

WHAT'S IN AN ASSOCIATION EMBLEM?

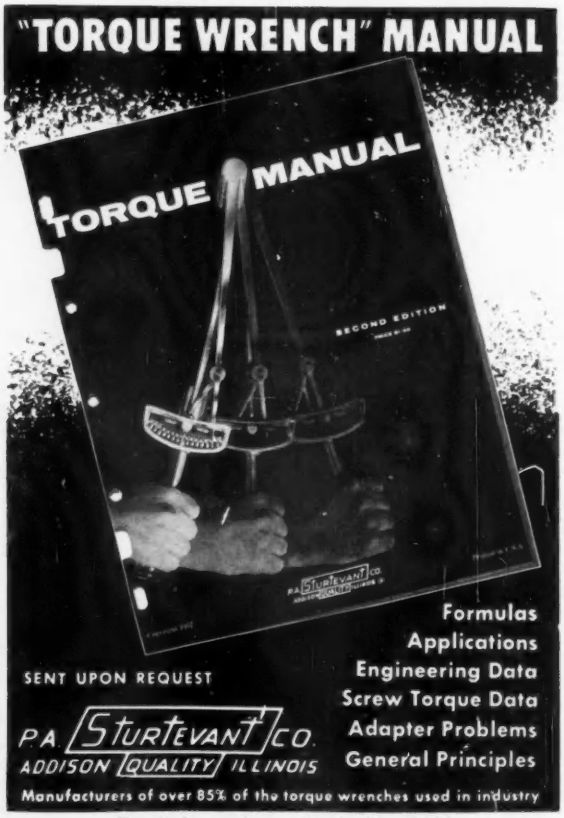
Naturally, we can't speak for every association, however, we would like to explain what the Association of Diesel Specialists' emblem means . . . both to you and to the entire diesel industry.

Each time you see the A.D.S. emblem displayed in a fuel injection service shop you will automatically know that here is one of the TOP shops in the nation and features . . . quality parts, unsurpassed technical knowledge and ability, finest equipment and above all—reliability.

For detailed information on the A.D.S. Repair Standards and the many other ways the Association is serving the diesel industry, write the Association of Diesel Specialists, Executive Headquarters, 633 East 63rd Street, Kansas City 10, Missouri.

P.S. An official directory of A.D.S. Service Shops and its Affiliate Manufacturers is also available for the asking.

For information write in No. 1011



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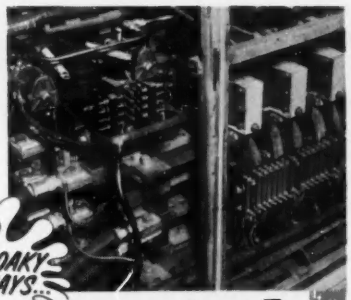
TO CLEAN ELECTRICAL EQUIPMENT FASTER WITH LESS COST...



LIX IT!

Lix Electrical Equipment Cleaner **quickly removes** grease, tar, dust, cement, etc. from motors, transformers, switch gear, most any type of electrical equipment. Lix Cleaner is applied by brushing or spraying... needs no rinsing and evaporates completely, leaving a dry, residue-free surface.

Lix Cleaner will not corrode delicate electrical connections and may be safely used. It is a non-conductor, creates no fire hazard and is low in toxicity. Clean **your** equipment faster, quicker and with less cost with Lix.

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KIENE® DIESEL

INDICATOR VALVES

Furnished with male ½" NPT engine connection. Other threads on order. Adaptations for most diesel locomotive engines.

Kiene valves have effective gas seal both open and closed without packing or glands. Operates against pressure — will never blow open. Small and rugged — 4¼" in length with only 3¼" circle of space for attachments. Kiene valves give better service under the most severe conditions. Standard indicator plug and wing nut connection.

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KIENE DIESEL ACCESSORIES, INC.
10352 PACIFIC AVE., FRANKLIN PARK, ILLINOIS

For information write in No. 1014

T. C. Brown

J. D. Lutz

H. C. Foster

Gould-National Makes Three Appointments

Gould-National Batteries, Inc. has announced appointment of **Thomas C. Brown** to the position general sales manager for the firm's newly-formed Engine Parts Division. This division includes Wilkening Manufacturing Co., White Machine Works, Arrow Head Steel Products and Gilette & Eaton.

H. C. Foster has been named to suceed Brown as replacement sales manager. **J. D. Lutz**, formerly of Wilkening, has been named manager-sales engineering, OEM and industrial.

Cummins Names VP-Research

Cummins Engine Co. announces promotion of **N. John Beck** to vice president-Research. In his new capacity Beck will be responsible for advanced engine and component development, engine design and applied research.

Autolite Appoints Director of Engineering

Paul F. Allmendinger has been named director of engineering for the **Electric Autolite Company's** electrical products group. He will manage engineering activities for generators, etc., and coordinate and initiate products development.

Clark Opens New Office

Clark Bros. Co. has opened a branch of its Pittsburgh office in Buffalo. **Charles P. Clark, Jr.** is in charge of the new office.

Roots-Connerville New Branch

Rootes-Connerville Blower has announced the opening of a new branch office in Midland Texas. **LeRoy C. Laycock** has been appointed branch manager.

Leece-Neville Promotes Five

Five significant promotions were announced by **Leece-Neville Co. J. S. Allt**, who continues as vice-president and treasurer, assumes additional responsibilities in management of all divisions.

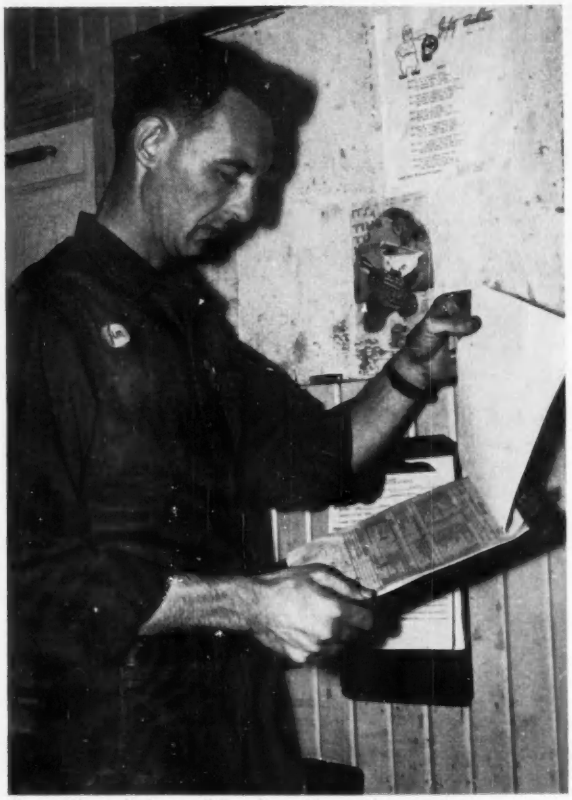
H. J. Zuske has been appointed vice-president and general manager, a newly created post, of the Fractional Horsepower Motor Div.

A. D. Gilchrist has been named vice-president and general manager of Alternator and Standard Products Div., also a new post.

R. G. Hill is now general sales manager, and **W. E. Carter** is sales manager of original equipment.

THIS MONTH'S DIESEL

JIM WORMINGTON
Maintenance Supervisor
The Western Company, Hobbs, New Mexico



Jim studies vehicle condition. Everything with an engine is checked at 50, 100, 300 and 900-hours of operation. Jim keeps the report; a copy goes to maintenance headquarters.

"Our first objective is to prevent a breakdown. If one does occur, we keep 'down time' to a minimum."

Thus Jim Wormington briefly describes his job as maintenance supervisor of the Western Company's Hobbs, N. M. district. His territory covers most of Southeastern New Mexico; and his duties—like those of other maintenance supervisors at Western districts throughout most of the Southwest's oil producing country—are responsibility for all of the company's equipment, keeping it in tip-top shape.

Western's primary business is pumping a variety of fluids into oil wells, and Jim's chief concerns are the equipment used to do it—mostly diesel powered. Diesels power nine hauling trucks, five of which also have diesel pumping units mounted on them. They are GMC, Mack, and Cummins, and they range from 180 to 600 horsepower. Two are 600-hp Cummins mounted on haul trucks used solely for pumping various materials into oil wells. One specially-equipped truck has combination 600-hp diesel engines: one 300-hp GMC mounted on the truck, and a similar hood engine that is used simultaneously when pumping.

Pump engines are usually run under "full load," while such materials as water, acid, sand, or lease crude oil are forced down into an oil well for stimulative purposes. A typical well treatment, for example, might call for 30,000 gallons of water along with 50,000 pounds of sand to be injected into the well under pressure, opening up underground porous zones, thus letting the well produce more freely.

For this work Western has found few engine modifications necessary. A relatively minor one has been to change out pulleys for installing heavier belts pulling fans on some cooling systems.

In the oil fields the work is rugged and the trucks are rugged, too. Note the tire wear on this I-H.

Keeping them Going . . .

"We do most of our maintenance work. If a piston needs changing, we do it right here in the shop. However, this is not 100%. If an engine requires a complete overhaul, for example, it is usually farmed out," Jim explained. Shop work, whether on one of the company's pickups and automobiles or on one of the big pump trucks, is handled by the supervisor and four assistants.

Most of Western's trucks normally operate within a 100 to 200-mile radius of its district headquarters, but travel is often over rugged oil country terrain.

In general, Jim determines parts inventory and purchases on what can be purchased locally. Major parts, which can't be purchased locally, are usually stocked in Western's main warehouse in Midland, Texas, where Paul Gosnell heads the company's entire maintenance program as general maintenance superintendent. These parts are shipped to Jim as he needs them. Ferrell Nixon is Western's district manager in Hobbs.

"Preventive maintenance is everything with us," Jim emphasized. "We strive in every way to prevent a breakdown, but if a truck does come back in trouble, then repair begins immediately and it is worked on until it is fixed. We're all on 24-hour call. Naturally, we try to eliminate breakdowns by using good preventive maintenance."

Western's PM program is fairly general throughout its system and calls for frequent and regular checks of all equipment. Each truck driver, for example, makes a written report on his vehicle's performance following every trip to the field. If a trouble spot shows up, or even is suspected, PM inspection begins immediately.

However, the company's real PM yardstick, Jim notes, is the hour meter placed on all equipment. "We check everything with a motor in it at specified intervals of every 50, 100, 300, and 900 hours of operating time. With this plan, each vehicle undergoes at least one check every 50 hours, with the 100, 300, and 900-hour checks a lot more thorough."

A look at a report on a 300-hour inspection, for in-

Diesel-powered trucks such as this one are used by Western for wire line services in Southwest oil fields they serve.

Smaller trucks are used for general utility, to transport supplies and pieces of equipment from one site to another.

Using Lengor oil sample kit, Jim extracts sample from engine undergoing 100-hour check.

Chemical reaction determines acid level of oil sample. Jim also checks for viscosity, dirt load, water content.

stance, shows the condition of hood engine and all accessories, electrical instruments, clutch, front axle, steering, springs, transmission, brakes, tanks and fittings, cab and auxiliary equipment, rear axle and springs, hydraulic systems, and auxiliary pumps. Any service is entered on the records.

One copy of the reports goes to the company's maintenance headquarters in Midland while another is kept in district office files, providing two complete PM and repair histories on each vehicle.

Preventive Maintenance . . .

Engine oil changes are made "when needed", as determined by used lube oil analysis, with a special Lengor oil tester kit.

"After the first 100 hours of running time, we check an oil sample from the engine every 50 hours through the tester," Jim explained. He added that the tester is effective in showing oil condition and also as a diagnostic tool to tell when something is going or has gone wrong. It's too early to quote effects on engine longevity but Jim feels that he is getting the most out of his oil while still protecting the engines.

In using the tester, an engine oil sample is compared against a sample of new oil, with chemical reaction, to determine viscosity, dirt load, acid and water content. Since the oil does not normally go bad suddenly, checking it every 50 hours allows Jim to keep it for its full life; yet not too long, so as to injure the engine it's there to protect.

Such PM work—whether keeping tabs on engine oil, filters, or an engine's overall condition—is the kind of job Jim Wormington likes.

Background on Jim . . .

Jim first became interested in diesel while working as a mechanic's helper one summer during high school days. Since then, mechanics—diesels in particular—have been his favorite subject.

He started his career with Western six years ago as a trainee following graduation from a two-year diesel course at Oklahoma A&M College (now Oklahoma State University). He was promoted to maintenance supervisor two years ago.

"I try to keep up with new developments and products by reading a lot—material put out by manufacturers and trade publications such as *Diesel Power* (now *Equipment Superintendent*)."

Perhaps this fervor for his work is the reason Jim Wormington finds the demanding job of mothering a fleet of oil well service trucks to his liking. He's a firm believer in the slogan Western places in prominent places on report forms to be used by maintenance supervisors. It reads: "The Maintenance of Equipment Is No Better Than the Man Doing the Work."

And Western is happy with the way Jim Wormington does it.

Check completed, kit is put away until needed for next inspection.

In-city diesels are cost-cutters

Western-Gilette buys fifty White Compacts with factory-fitted Perkins Six/354's for P.U.D. service.

A typical unit.

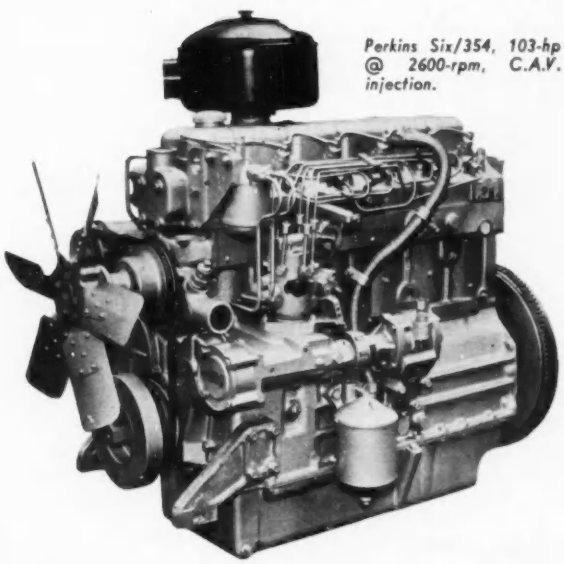
Another page in short-haul trucking history is being written in Tulsa, Oklahoma. Here, a fleet of 50 2-ton White Compacts factory-fitted with Perkins six/354 diesels is averaging an incredible 13-mpg in metropolitan pickup and delivery service for Western-Gilette. The gasoline fleet had been averaging 5- to 7-mpg.

Credit for the original idea and its implementation must go to Western-Gilette's Frank Zottarelli and the Los Angeles maintenance and repair depot. Frank got the idea from another successful switch from gasoline to diesel in a related application, and his intellectual curiosity took over from there.

Transicold refrigeration units (Perkins-powered) fitted to Western Gilette's reefer fleet showed a spectacular improvement in fuel consumption figures and a corresponding reduction in maintenance when converted to diesel. Frank reasoned that whatever worked once might work twice: why not try repowering the pickup and delivery fleet?

The First Repowering . . .

Frank, who is Fleet Maintenance Superintendent, worked out the initial repowering problems, using a Ford C-600 cab-over truck and the Perkins six/354 diesel. This engine is a direct-injection in-line six fitted with C.A.V. fuel injection, rated 103-hp (net) @ 2600-rpm, produces 254 lb-ft torque @ 1450-rpm. This engine was developed for this service and is widely used in England in trucks up to 6-ton capacity. The Commer 3 and 4-ton and Karrier 4, 5 and 6-ton models, for example. Engines are supplied in the U. S. by Chrysler's M & I Division.



Perkins Six/354, 103-hp @ 2600-rpm, C.A.V. injection.

Frank determined that little overall economy would be gained if they were forced to make extensive engine compartment and accessory conversions at time of repowering. Accordingly, the original cooling system, clutch and drive line were used and, other than minor support alterations, no engine compartment modifications were involved. In the drive line, the original clutch, 4-speed Borg-Warner gearbox and the 6.8 rear end were used. As originally powered with the gasoline engine, truck had a top speed of 65-mph: dieselized, and with no change in gearing, top speed is 52-mph. This is certainly adequate for an in-city truck.

Having proved with this one conversion that the diesel engine is both feasible and desirable in this application, attention was turned toward getting more of them. Easy? Not really. Who makes them—or at least, who made them then?

The Need is Filled . . .

White, seeing the potential of diesel-powered light-load short haul, had already been thinking along these lines. They moved in quickly with their 2-ton Compact, powered by the same Perkins six/354—and Western-Gilette promptly ordered 50 of them.

The White-Perkins Compact uses a 5-speed fourth-direct fifth-overdrive Borg-Warner gearbox with a 6.8.1 Timken axle and rear end. This combination provides a top speed of slightly better than 52-mph.

The Results . . .

Western-Gilette's crew has been particularly impressed by the low maintenance factor on the Perkins diesels. For example, the lone White-Perkins that operates out of the Los Angeles depot has covered over 15,000 miles of short-haul in-traffic work. This consists of ten or more pickups and deliveries per day in metropolitan Los Angeles, averaging 75- to 100 miles per day. And the story is the same in Tulsa.

(continued on page 29)

Webb advises: "Don't port the exhaust throat of a turbo. You're only decreasing turbocharger efficiency and increasing noise".

Why Do Turbos Fail?

An expert spells out the things that make turbos fail . . . and tells what to do to prevent them

"Foreign particles and improper lubrication are accounting for most on-highway and off-highway turbocharger failures."

This is how Jim Webb, owner of Turbocharger, Inc. of Downey, California, sizes up turbocharger operational difficulties. He speaks in the light of eight years of turbocharger experience—the most recent three of them running his own large rebuild plant. Because Webb's Turbocharger, Inc. plant handles all makes of turbochargers, he is a good person to listen to.

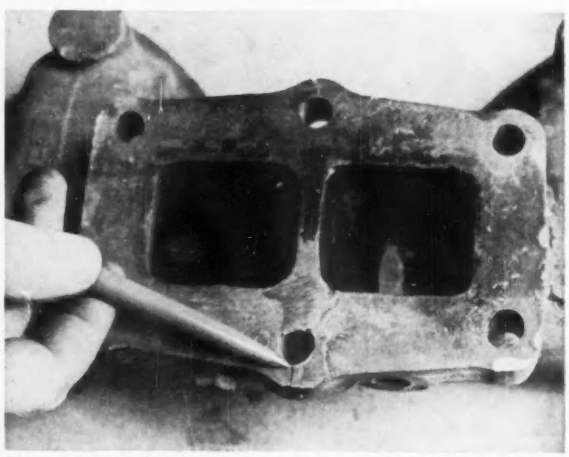
"Foreign particles account for the largest number of failures of turbochargers of all makes," adds Webb. "I'm talking about dirt ranging from fifty-micron particles resulting from normal engine wear to chunks of gasket left in the engine following the last overhaul."

In concert with most other turbocharger specialists, Webb notes that improper turbocharger bearing lubrication is another major contributing factor to failures of turbochargers of all makes.

To the average maintenance superintendent with five or ten turbos to look at, Webb admits that it's frequently difficult to determine where trouble began after a turbo has gone sour. But he has some maintenance suggestions that will cut down on failures in the turbocharger system.

Bearing Lubrication . . .

A minimum requirement of any system expected to make efficient and long-term use of a turbocharger is elimination of all particles of 20-micron size and above from the lubricating oil. In general, if one engine lube oil is kept in good enough condition for engine use, it is suitable for the turbocharger. But if this lube oil condition is allowed to slip, it shows up in time on the engine but much faster in the turbocharger. Provision of



Even the best turbocharger can cause the cast iron intake manifold to crack, and brazing is seldom a permanent solution to it. For a better solution,

a filter in the turbo supply line is one way to safeguard the turbo bearings *if this filter is serviced at regular intervals.*

Most turbocharger lubrication problems arise from the method of starting up a newly-installed turbocharger, or a turbocharger that has been drained as a part of engine servicing.

"This problem can be handled two ways. You can charge your engine lubrication system with oil under pressure, bleeding your turbocharger bearings until the oil flows freely, or you can keep the turbo from spinning while the idling engine pumps the oil through the turbocharger bearings. This takes about 60 seconds. We recommend the latter because it is simpler and quicker."

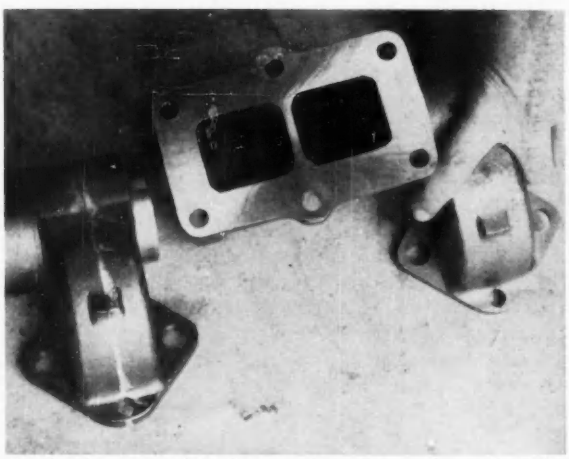
Webb advises that the turbine shaft should be hand-held to keep the turbo from spinning—never use a wrench or screwdriver for this purpose. With the engine running at normal idle, a turbine shaft can be hand-held with ease by grasping the nut on the turbine mounting shaft. Engine idle speed is adequate to pump lubricating oil into the area of the turbocharger bearings.

The Turbo "System" . . .

Jim Webb doesn't look at turbocharging as the installation of a unit. He thinks of it as the addition of a system. This is the way the manufacturers see it and, accordingly, when fitting a turbo to an existing engine his firm frequently spends time improving intake and exhaust manifold designs than they do repairing, rebuilding and installing the actual turbochargers themselves.

A product of this work is a universal turbo inlet manifold being manufactured by Turbo Rebuild. It is built of stainless steel and is quickly adaptable to virtually all common makes of equipment and turbochargers. This small unit eliminates one of the more common troubles —the cracking of cast iron manifolds that frequently occurs as a result of vibration and expansion and contraction.

Exhaust tailpipe systems are always suspect on



Turbochargers, Inc. has perfected a universal stainless steel intake manifold and turbocharger mount that fits most common units found in common use.

Jim Webb does not recommend rebuilding turbos in the small shop. The high-speed units require special handling techniques. Here, Jim applies a controlled amount of heat to expand the compressor wheel for removal from the shaft.

equipment brought into the turbo rebuild plant when the operators complain of poor efficiency and excessive turbocharger bearing wear. This is particularly true when the turbocharger was not installed as part of the factory delivery equipment.

Exhaust system must be large enough to virtually eliminate back pressure. On the most common sizes a 5-in. tailpipe is needed and operators going to this from a smaller size will notice immediately increased efficiency and lower turbocharger temperature. The bearings will stay in longer. The modern turbocharger moves a tremendous volume of very hot exhaust gas—much more than the original exhaust system was designed to handle when fitted to the naturally aspirated engine.

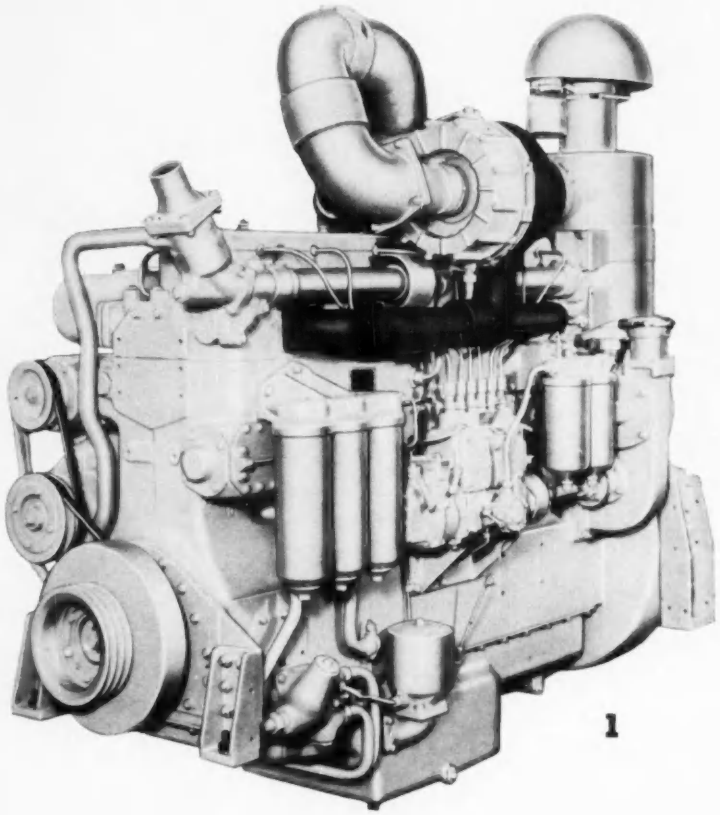
As fleet maintenance departments become more savvy on the servicing and repair of turbochargers, Webb reports that increasing numbers of shop modifications of original turbochargers are turning up. One of the most frequent—and most unsatisfactory—alterations to original equipment, according to Jim Webb, is the "porting" of the exhaust throat in the belief that this improves turbocharger life or efficiency.

States Webb, "This actually decreases turbocharger efficiency and has the very undesirable effect of increasing stack noise."

Asked about the desirability of modifying commonly available turbochargers, Webb tips his hat to American manufacturers by commenting that all of them

(Continued on page 29)

F-M's 50A Engine Series



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Fairbanks, Morse & Company, long in the diesel field with low-speed and medium-speed engines, has introduced a new series of smaller, faster engines—the model 50A series. Power range is from 37-hp to 670-hp.

The 50A is a series of multi-purpose workhorses that will handle many lighter-duty jobs below the range of the larger, heavier engines. They are well adapted for electric power generation and for installations where long periods of uninterrupted running are required. Industrial plants, commercial businesses and hospitals are among the potential users of these engines incorporated into generating sets for both primary and standby power. They will be able to run unattended for long periods, which also makes them applicable to communications requirements. Irrigation, flood control and power for construction machinery are applications where easy starting and simple installation are assets.

Construction Features . . .

"Open" combustion chambers, with toroidal cavities in the pistons are designed into the engines. Toroidal is a term used by F-M engineers to describe the shape of the open area recessed in the pistons, obtained by the overlapping of two hemi-spherical cut-outs. This design, according to word from F-M, is instrumental in the complete combustion of fuel at all loads and speeds. Also, fast response to load changes is achieved without the disadvantages of hard, slow starting. Combustion takes place in the single combustion space between piston and cylinder head.

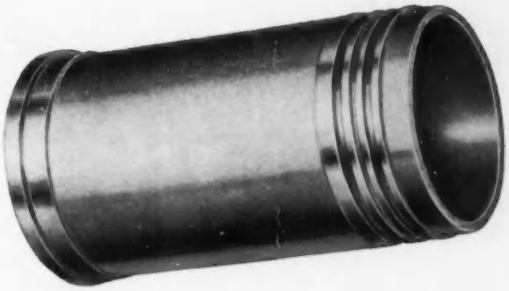
Engines are naturally-aspirated and turbocharged, in both in-line and V-type configurations. Design includes hardened steel crankshaft with precision bearings at both mains and connecting rods. These rods are alloy steel with 35° angle split at lower end to allow removal of rod and piston assembly through cylinder bore. Cylinder bores are removeable wet liners.

Injection systems are direct, supplied by C. A. V. and Simms; C. A. V. for 50A5 engines and Simms for the larger 50A6 series.

Parts interchangeability for simplified supply is accomplished by use of only two primary bores-and-stroke combinations for the whole series. 50A5 engines, rated up to 200-hp, use bore and stroke of 4.92-ins x 5.12-ins. Series 50A6 units, over 200-hp, use bore and stroke of 6.25-ins x 6.50-ins. This higher power category employs the in-line 6, V-8 and V-12 configuration. A for-special-application in-line 6 with a different bore and stroke (5.00-ins. x 5.875-ins.) is also available within the lower-powered 50A5 series.

With, generally, only two bore and strokes, key engine sizes are turbocharged to obtain a smooth progression of ratings over the entire power range. At present, five versions, all operating at 1800-rpm, are being offered. Larger and smaller sizes will be added soon to extend applicational suitability of F-M's new line of engines even further.

Fairbanks, Morse adds a smaller higher-speed series to their diesel engine line



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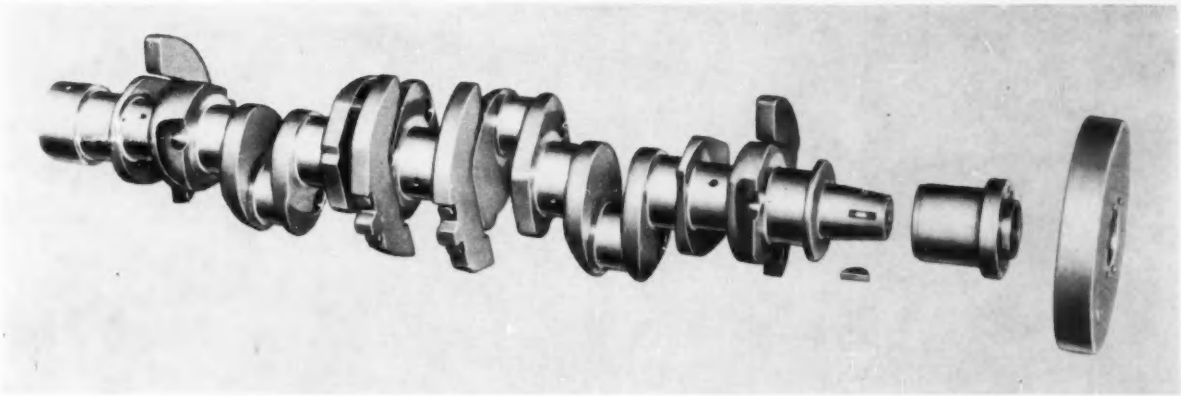

4

5

1 *Engines are fitted with C.A.V. fuel injection units. Smaller* 50A5 *engines in turbocharged versions use a C.A.V. turbo. This, incidentally, is the first C.A.V. application in this country on a production engine series. Larger* 50A6 *turbocharged engines are fitted with turbos by Schwitzer.*

2 *Liners are cast grey iron with "pimple" chrome plated inner surfaces.*

3 *Crank is forged, induction hardened at pins and journals, is counter- and dynamically-balanced. Main and con rod bearings are precision type.*

4 *Head has removable valve guides and seats. Individual heads are furnished with V-engines; in-line engines use combination heads, 2 or 3 cylinder. High wall valve chamber houses the shrouded, removable overhead valves.*

5 *Con rods are H-section alloy steel stamping with lower end split 35° to provide removal of assembly through bore. Note ring below pin.*

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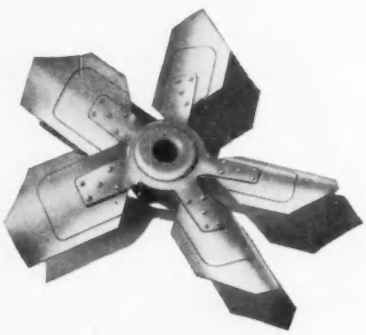

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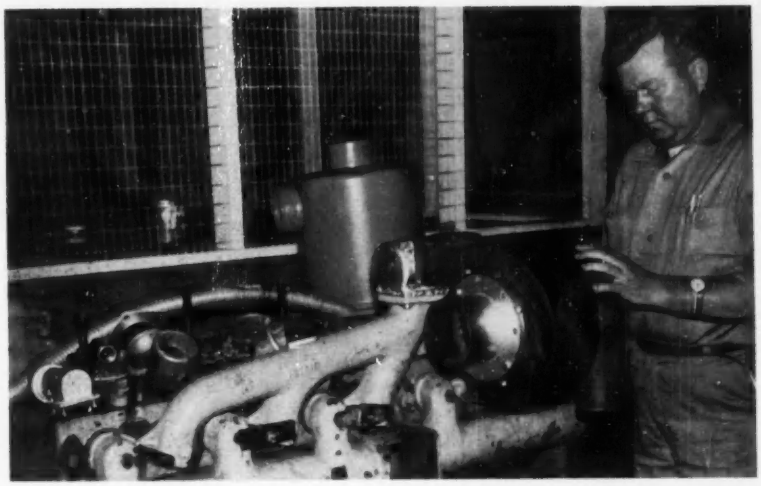
Why Turbos Fail . . .

(continued from page 23)

are well-designed and well-manufactured, and that most are correctly matched to the equipment on which they are installed. His firm uses dynamic balancing equipment as part of the rebuilding and repair operations and the firm's experience indicates that turbocharger failures resulting from imbalance of the original equipment is practically unheard of.

"If a turbo is going to go out because of mechanical reasons," add Webb, "it will go out in the first hundred miles. When a turbo loses efficiency or blows up after a thousand miles of operation, you are almost certain to find that the cause of the difficulty is from foreign matter in your turbo lubrication, a lack of lubrication—usually when the equipment is first started—or an exhaust manifold system that is inadequate for the turbocharger."



Jim Webb looks at turbochargers as a system rather than a single unit, is able to handle successful modifications such as this addition to a naturally-aspirated Caterpillar for use in off-highway work.

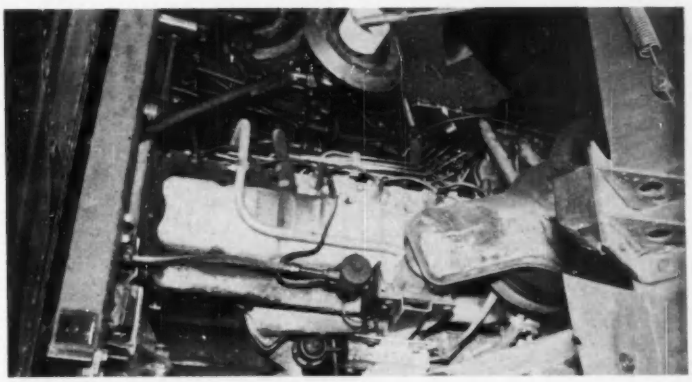
In-City Diesels . . .

(continued from page 21)

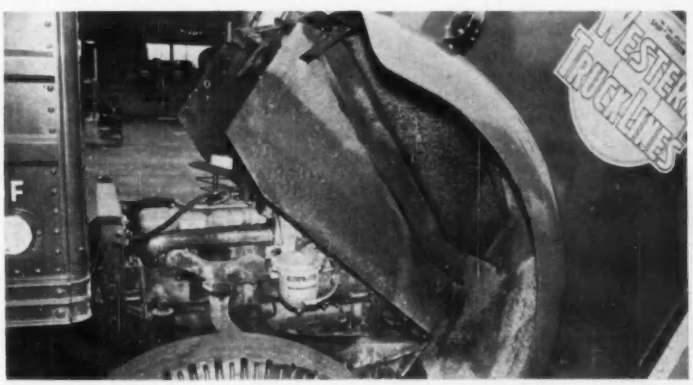
"We expect at least 150,000 trouble-free miles," says Frank Zottarelli. "This is what we expect to get conservatively, and if we can keep them running 200,000 miles we won't be surprised."

"Not only that," he adds, "we are noticing less clutch and driveline trouble than with the gasoline engines. We believe this is because we are working with less power; the men aren't barreling out of intersections like they used to with the V8 gasoline engines."

Western Gilette vice president Tom Rafael sizes up the whole short-haul diesel experiment at Western-Gilette when he remarks: "The only thing we've really got to sell is better speed, better service. With things as competitive as they are, the only way we can make a profit is by cutting costs. You can only go so fast in a truck. Our diesels give us this much speed, and they add the element of reliability. On top of that, they're making a big dent in operating costs."



Installation economy was inherent by use of original drive line and cooling system.



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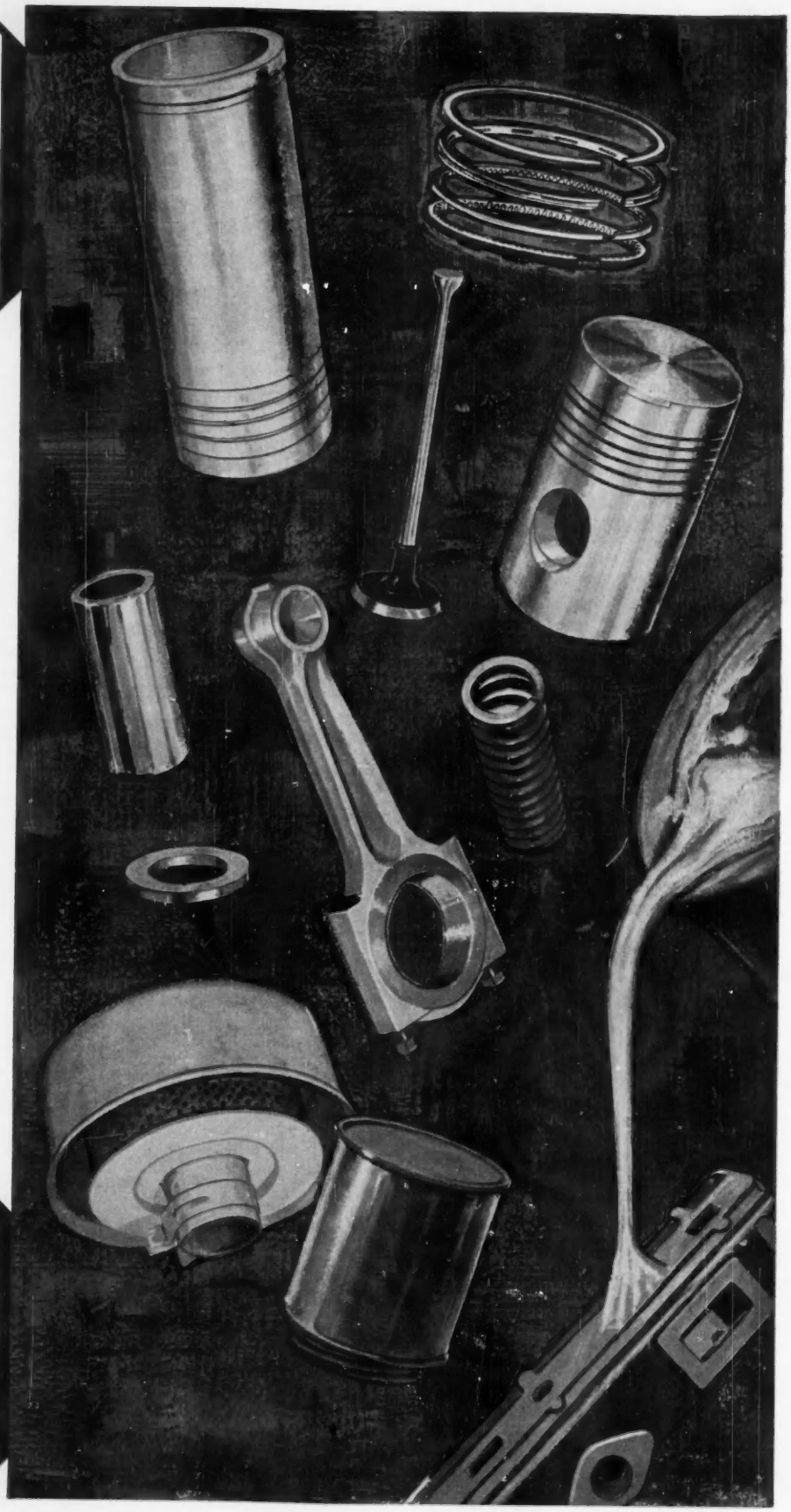

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Cast aluminum wheel hub has been sleeved, held in place with pins (circled). Then precision bored.

Western's Fleets Get Long Service Life

Long-term equipment longevity maintenance philosophy pays off in profits for Western Milk Transport

At Western Milk Transport in Tulare, California, the fleet maintenance department talks about "finicky maintenance," and "equipment longevity." Both terms are linked closely to WMT's reputation as one of the best equipped, largest and fastest growing bulk milk carriers in the West.

Two forces have forged WMT's unique shop and maintenance program. First, the singular service demands of the dairy industry. Second, the conviction of fleet maintenance manager Gordon Runo that long-term equipment reliability takes precedence over month-to-month profit and loss reports.

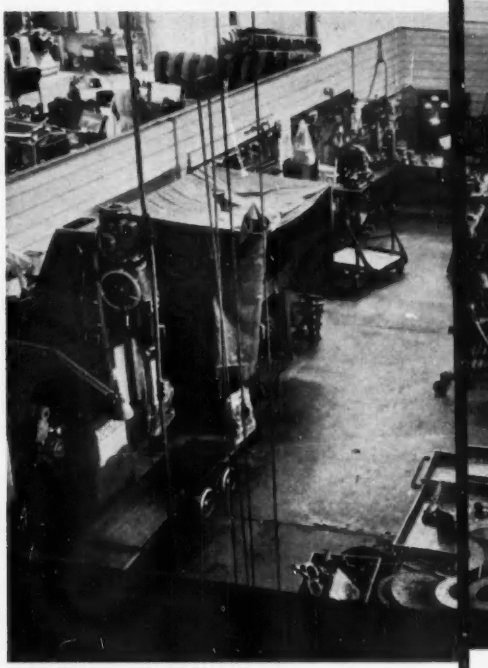
The firm runs two fleets. A fleet of light trucks is used for dairy-to-dairy gathering and the transport of unprocessed products to local creameries.

The second fleet, and the largest, handles inter-plant deliveries of processed products—milk in bulk, ice cream, cottage cheese, etc. Here long haul, diesel powered rigs—mostly Cummins-powered Macks—are used. All told, WMT runs about 300 pieces of equipment.

Making the Equipment Last . . .

The common denominator of Western Milk Transport's maintenance and repair effort is a determination to get more life from their highway equipment. An indication of their success in this effort is the fact that manufacturers are turning to WMT for answers to some basic maintenance and design questions. What they're finding at WMT is a penetrating research program into equipment failures and remedial steps rather than reliance on component replacement.

"We're happy to see the industry taking an interest in this program,"



Precision boring and alignment of gearboxes during rebuild more than equals orginal parts life.

remarks Runo. "Our main effort, however, is to cut short the long-term spiralling of maintenance costs."

A dramatic example of the WMT technique, its costs and payoff, surrounds their $8,000 AMC boring machine. This is a Danish-built unit normally found only in basic manufacturing plants.

Rebuilt transmissions for their long haul equipment weren't producing the operational life they expected. As with other fleets, replacement bearings were the big headache. They wouldn't last.

Checking over some newly rebuilt boxes, WMT's people found that bearing bores weren't in precise alignment. When they went back to the rebuild shop, they discovered that reboring of the cases was being done by portable boring machines and that this technique was

Shop is clean, well lighted. Note the number of locating fixtures for component work. Perfection is expected, inventiveness encouraged.

considered industry standard on transmission rebuild work.

Runo's men checked bearing alignment against factory specs, found no shop consistently came close to turning out the kind of job the equipment manufacturers had found to be minimum acceptance.

Hence, the purchase of the boring machine. Now there is no question about alignment of replacement bearing sleeves, the bearings and the shafts. The result: rebuilt transmissions at WMT have an operational life equal to new equipment.

"We use cylinder stock for bearing sleeves," notes one of the maintenance men. "We use a sleeve that's slightly undersize, and make a shrink fit in the box, then use the boring machine to get precise bore and alignment."

Their deep freeze box for chilling the sleeves is a discarded deep freeze chest. The oven used for heating the female component is a junked ice box fitted with three 220 volt heating elements and a thermostat. An overnight heating and chilling of the respective parts permits an easy assembly early the following morning without chancing a weakening or distortion of either part by rapid localized heating.

Increasing Utilization . . .

The boring machine has subsequently found other uses. It played a key role in solving a wheel balance problem common to all fleet operators and normally remedied only by adding weights to the wheels or shaving tire tread. Again, shop research proved that normal rebuilding techniques were at fault.

Wheel bearing sleeves are usually replaced by filling the worn bearing recesses with weld, then turning them back out to size for acceptance of new bearings. But the heat of the weld upsets the heat treating characteristics of cast iron and cast aluminum hubs, resulting in distortion of the hub itself. Maintenance people normally "correct" this by shaving tire tread, weighting the wheels, or both.

By boring the hub bearing recess oversize, then resleeving with cylinder sleeve stock, pinning the sleeve into the hub with two brass pins, then reboring to precise bearing alignment, WMT has cut its tire wear and wheel balancing problems to practically nothing.

And It Pays Off . . .

Western Milk Transport averages 345,000 miles on an engine before rebuilding and has line bored only three engines in ten years.

Their own research proved that properly fueled engines cannot twist or distort a bearing saddle—that even badly overfueled engines can seldom damage bearing saddles enough to require reboring.

"Common practice is to assume that any engine being rebuilt automatically needs bearing saddles rebored," notes Runo. "We didn't believe this to be the case and we purchased a bearing plug gauge to verify

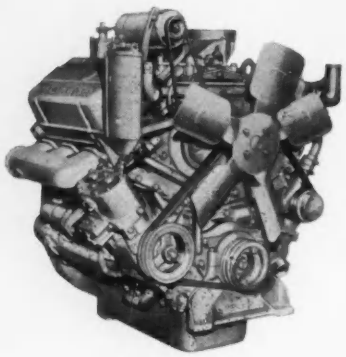
(Continued on page 51)

Bearing sleeves are shrunk for sweat-fit in small freeze chest.

Housings are heated in thermostatically-controlled electric oven.

Standup desks with reference libraries are credited with most of WMT's research ideas.

"JIMMYS" go multifuel



All distillates in the range from Diesel No. 2 to Combat Gasoline can now be burned with no adjustment in the full Series 53 and 71 engine family. Commercial models convert with simple kit.

"Logistics" is a key word in military parlance. It's the science of having the right things at the right places at the right time and in the right quantities. A rifle without ammunition that fits is useless; an engine without fuel it can burn is also useless. There's not much you can do about the rifle except get the right ammunition but with an engine, multifuel capability is a big assist to the logistical problem.

This explains the Military's interest in multifuel engines. Now here are details of what GM's Detroit Diesel Engine Division has done to broaden the fuel appetite of their engine family to cover the whole spectrum of fuels normally to be found in military installations and their supply lines.

What are these fuels? Here's a breakdown on commonly-supplied military engine fuels:

(1) *Diesel Fuel Oil* #2 (*Mil Spec* VV-7-800)—This is regular diesel fuel that meets requirements of all automotive-type high and medium-speed diesels where ambient temperatures are above 20°F.

(2) *Compression Ignition Engine Fuel* (*Mil Spec F-45121A*) (*C.I.E.*)—This covers one grade of fuel used in research, development, proof-testing and qualification of compression-ignition engines.

(3) *Combat Gasoline* (*Mil Spec G-3056*)—A combat grade gasoline suitable for use in all gasoline engines under all service conditions.

Within this broad distillation range are other military fuels to consider—the JP series used in aircraft for example. There's the JP #3, the JP #4 (single largest volume military fuel used today) and the JP #5 that meets special Navy jet requirements.

Also, commonly available commercial fuels must be considered. These include, primarily, Diesel Fuel Oil #1 and select quality commercial kerosene.

These, then, are the fuels, one or more of which could be expected to be available for military use within a theater of operations. They are also the fuels on which Detroit Diesel's multifuel engines will operate efficiently. Further, they will run well on any other fuel in the gravity range between the Diesel #2 and Combat Gasoline . . . or any mixture of these . . . without need for engine adjustment.

What's the Multifuel Problem?

All reference here is in terms of fuel in the distillate range; residual fuels are something different. For distillates, problems of burning and handling fuels increase as their specific gravity decreases. The Series 53 and 71 engines could already burn the heavier gravity fuels from the Diesel #2 down through the Army's C.I.E. fuel. Main problem was to extend the capability

downward in the gravity range to include gasoline.

As far back as World War II, tests were run to see if the "Jimmy" could burn gasoline and a wide variety of fuels. Though tests were not carried to ultimate conclusions, they did demonstrate that these engines could burn a variety of fuels if tailored for the job.

Actually, real incentive for multifuel operation started with wholesale operation of jets with their huge appetite for fuel. This complicated the petroleum product procurement and supply picture, one that would get worse in time of emergency. This caused Detroit Diesel to reactivate its multifuel program.

Primary problems involve the physical characteristics of the lighter distillates and some of their effects on the mechanics of handling and burning them. First, consider heating value. A gallon of combat gasoline has about 11% less heat value than a gallon of Diesel #2. Therefore, per unit of fuel delivered by the injectors, the switch from diesel fuel to gasoline means a drop in heat input to the cylinder of 11%.

Next, consider viscosity. As specific gravity goes down, viscosity decreases. All injectors have a finite clearance between plunger and bushing. As viscosity decreases, leakage past the plunger will be higher and delivery per stroke everything else being equal, will be lower. This is another source of loss.

Finally, compressibility or "bulk modulus" of the different fuels must be taken into account. That for combat gasoline is 170,000 psi; diesel #2 is 210,000 psi. Thus, at a given pressure, the volumetric efficiency of the injector is in effect reduced in approximately the same ratio. Here is still another potential source of power loss.

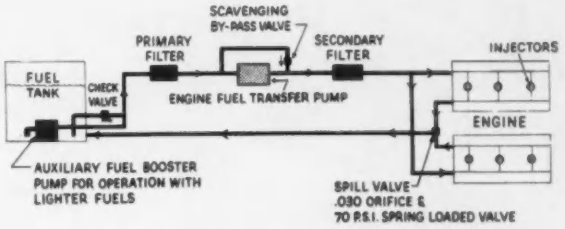
Note that these characteristics of different fuels have nothing to do with the ability of the engine to produce maximum power. The problem is a mechanical one of getting enough of each type fuel into the cylinder to develop maximum power without some adjustment. This means that if the engine is set for maximum power on diesel #2, a maximum power loss of about 23%, 18% due to physical and chemical properties and the remainder in thermal efficiency, would be obtained with combat gasoline. If set for maximum power on combat gasoline, the engine would be severely overfueled when running on diesel #2.

It is a reasonable assumption that the military will adopt some particular fuel as standard and it would now appear to be Army C.I.E. fuel. The results when the engine is set for maximum power with this fuel are shown.

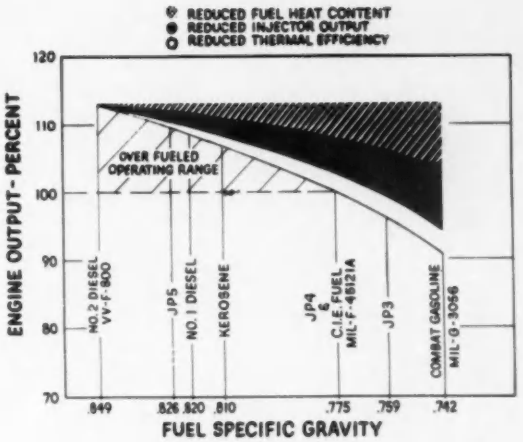
What GM Engineers Did

At first glance it would appear that the solution to successful multifuel operation was ridiculously simple. It's deceptive. What was done was simple, lending itself to provision of a conversion kit for commercial engines, but finding out what to do was the hard part. The problem was attacked systematically with the basic concept that whatever was done, to be successful, had to be done within the framework of present tooling and facilities.

The conversion kit consists of a group of five parts. First, there's a new piston. It boosts the standard 17.5:1 compression ratio to 23:1 by slight modification of the bowl. Additional heat of higher compression is necessary to ignite the lower specific gravity fuels with their very low cetane ratings.



Modifications of fuel system for multifuel operation include booster pump, increased output transfer pump, bypasses, new spill valve and use of needle-valve injectors.



Effects of fuel's specific gravity on maximum engine output of 6V-53 engine at 2800 rpm. Chart shows result with fuel settings for 100% output using Military C.I.E. fuel.

Location of a "fire ring" about ⅛-in. below the piston crown was introduced on production engines in 1955. It contributed several advantages and these were intensified in application to multifuel operation. High location gives the maximum possible compression and expansion strokes. All air is trapped above the ring and is available for combustion. Also, radial air velocity into the combustion chamber is increased. An important additional effect is that the high ring reduces cylinder wall area exposed to burning gases and minimizes heat loss. Combustion chamber surface-to-volume ratio was reduced 30%.

The higher compression ratio raises cylinder pressure by 50 psi at 150 to 200-rpm cranking speeds while at 400-rpm, the idling range, the pressure increase is about 150-psi. This pressure and temperature boost permits unaided starting on combat gasoline down to about 40° F.

Second item in the kit is a needle valve-type injector. This probably contributes the most to successful multifuel operation. The normal crown valve located below

the pump section is replaced by a differential needle valve. Where the crown valve opened and closd at a nominal 650-psi pressure, the needle valve opens at about 2800-psi and closes at about 2000-psi.

Principal reason for this change was elimination of the rather large volume of fuel between the crown valve and the orifices. While this is not a major problem in diesel operation it increases in severity with gasoline fuel as higher vapor pressure and lower viscosity caused it to be forced out the orifices after combustion. This left voids to be filled on the next pump stroke and caused erratic operation.

The needle valve with its seat near the injector tip avoids this problem. Also, higher opening and closing pressures improve atomization of small fuel quantities and gives sharp delivery shutoff. Starting and light-load operation was improved and increased thermal efficiency was noted.

Converting a production needle-valve injector to a multifuel unit requires minor modification. Spray tip configuration is slightly different. The small bleed hole in the production flat check valve is eliminated for the multifuel injector.

Three items remaining all concern the fuel system. The normal fuel pump circulates about 10 times the amount of fuel actually used, returning the surplus to the tank. With high vapor-pressure gasoline this was found inadequate. A higher-capacity transfer pump now flows about 20 times the fuel requirement.

Possibility of long lines and filter restriction causing vapor lock during operation on gasoline dictated use of a submerged-type electric primary pump at the tank. An additional advantage is that this pump can be used for purging the system prior to starting or after fuel system servicing. Bypasses were arranged (see diagram) to permit the primary pump to pump around, rather than through, the transfer pump. Also, a bypass at the tank allows the transfer pump to pump fuel directly without flowing it through the primary pump.

The last item is a combination of return spill port and bypass arrangement. A 0.030-in. spill port orifice is used to insure some flow at all times. A spring-loaded valve is in parallel with the orifice and insures adequate fuel flow during high-speed operation. Fuel system pressure is held at about 70 psi, roughly twice normal diesel pressure.

Research Continuing

While Detroit Diesel is satisfied that they have a complete line of multifuel engines for the military . . . plus the facilities to mass-produce them . . . further work is continuing. This is in the area of refinements. For example, developments now underway indicate good possibility of recovering thermal efficiency losses and some resulting from reduced injector output with the lighter fuels.

Cold weather starting is another area receiving attention. The regular integral airbox heater will handle starts at well below zero temperatures. Also, there will be winterization kits for starting at down to —65°F. An automatic exhaust restriction device that produces additional cylinder pressure even at cranking speeds is under development. Plus this, they are working on

Bowl modification of multifuel piston, right, raises compression ratio to 23:1. Note high fire ring.

an exhaust-to-air inlet heat exchanger that will be integral with the muffler.

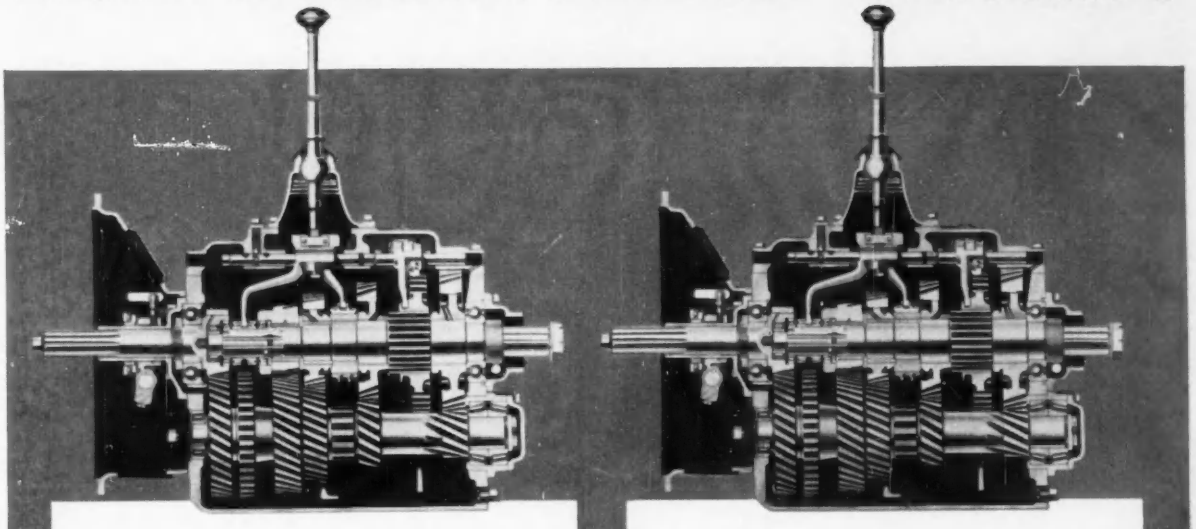
Laboratory testing is now giving way to the field phases of performance and durability. Installations in military vehicles have been made and proving-ground tests are proceeding with good results. Promise to the military is a horsepower coverage from 20 to 650 in single engine units with broad versatility of arrangement and rotation; with maximum parts interchangeability within each of the two lines; and with full multifuel capability while retaining the comparable thermal efficiencies of modern high-speed diesels.

In practice, engine burns whatever fuel is in tank. For demonstration, driver selects at will from separate tanks.

NEW FULLER 5-SPEED TRANSMISSIONS

for diesel engines 195 to 250 hp

LIGHTWEIGHT... HIGH CAPACITY



Model 5-H-74 and 5-HA-74

designed for use with 2-speed auxiliaries, 3-speed auxiliaries, 2-speed axles.

GEAR RATIOS:	
5th	1.00
4th	1.17
3rd	1.98
2nd	3.61
1st	6.60
Rev	6.51

Model 5-HA-74—93 lbs. lighter with aluminum case and clutch housing.

Model 5-H-75 and 5-HA-75

designed for use with Fuller 4-C-75 4-speed auxiliaries and 3-speed tandem axles.

GEAR RATIOS:	
5th	1.00
4th	1.56
3rd	2.43
2nd	3.91
1st	6.60
Rev	6.51

Model 5-HA-75—95 lbs. lighter with aluminum case and clutch housing.

- Extremely high capacity-to-weight ratio
- Ideal gear ratios
- Wide gear faces
- Mainshafts of greater diameter
- High-capacity pilot bearings
- Helical gearing
- Jaw clutch engaged—for easy shifting

For maximum versatility and reliability in your operation, Specify the Model . . . SPECIFY

FULLER TRANSMISSION DIVISION

EATON MANUFACTURING COMPANY

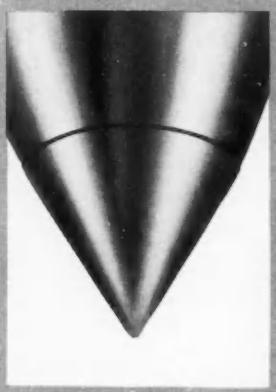
KALAMAZOO, MICHIGAN

Sales & Service: West. Dist. Branch, Oakland 6, Cal. • Southwest Dist. Office, Tulsa 3, Okla. • Automotive Products Co., Ltd., Brock House, Langham St., London W.1, England, European Rep.

For information write in No. 1017

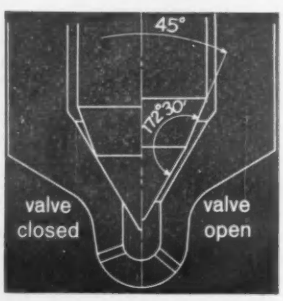
Extraordinary new nozzle development

Single cone valve after use



New double cone valve after use

A ROBERT BOSCH exclusive: The double cone nozzle valve seat

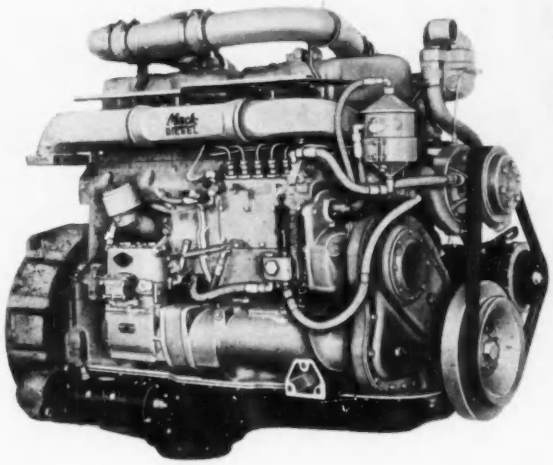


Blue print shows new valve seating made possible by the ROBERT BOSCH double cone design.

Here is the first major breakthrough in hole-type nozzle design in many years. What precisely is it? It is an ingenious double cone seat precision engineered to overcome fuel turbulence and resulting cavitation erosion. Closing, hydraulically cushioned to reduce pounding, allows greater valve lift for more flow area. Makes smaller valve seat diameters possible. This patented design which enormously extends nozzle life is exclusive with ROBERT BOSCH, noted for diesel engineering leadership and world-wide service. For complete data write: ROBERT BOSCH CORPORATION, 40-25 Crescent St., Long Island City 1, N.Y. Branch: 225 Seventh St., San Francisco 3, Calif.

ROBERT BOSCH FUEL INJECTION EQUIPMENT

For information write in No. 1018



10 MORE HORSES

for Mack's END 673P

Ram turning on the Thermodyne takes more power from the same basic package

Mack's naturally-aspirated Thermodyne series' newest addition is the END 673P engine, called the PoweRam. Through refinement of the basic design, Mack has increased the engine's breathing capacity (volumetric efficiency) in the working range by 10%. This, combined with altered fuel injection pump delivery to match the free-breathing characteristics, gives the user 10 more horsepower without a corresponding increase in weight. Heart of the refinement is tuned induction, or ram tuning of the manifolding.

What is Ram Tuning . . .

While the intake valve of a naturally-aspirated engine's cylinder is open, atmospheric pressure pushes air in to fill the partial vacuum created on the piston's suction stroke. Restriction from manifold piping and the intake valve keeps the cylinder from filling completely.

Then there's the problem of the inertia of the air as it moves through the manifold. Air is compressible, and the opening and closing of the intake valve creates pressure waves that move back and forth in the manifold. Pulsing in the wrong direction, these pressure waves can reduce the weight of air that enters the cylinder.

A tuned manifold arranges that these pressure waves are moving in the direction of the intake valve at the time it opens, thereby assisting in filling the cylinder. Result is a heavier weight of air per charge. Tuning is an effective method of increasing power. Since a greater weight of air is available more fuel can be burned to attain higher pressures and hence higher output.

The Engine . . .

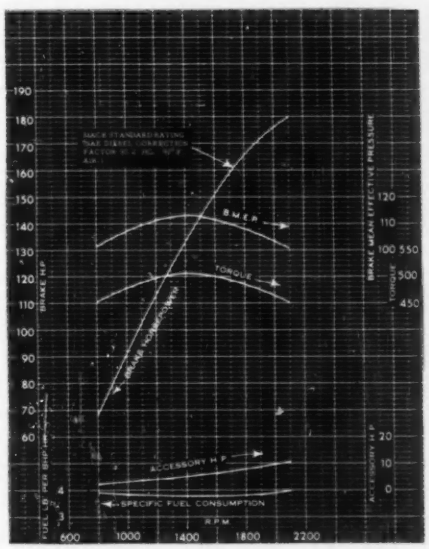
Mack's PoweRam Thermodyne END 673P has the same basic specifications as its stablemate, END 673. It's a 6-cyl 4-cycle engine with a bore and stroke of 4.87-in. x 6.00-in. Formerly rated 170-hp @ 2100-rpm, output has been raised to 180-hp at the same engine speed. Rating is at 30.2-in. Hg and 90°F.

Maximum torque of the 673P is increased to 505-lb/ft @ 1400-rpm. This increase is due to the tuned induction and the increased fuel quantity that the denser charge will burn efficiently.

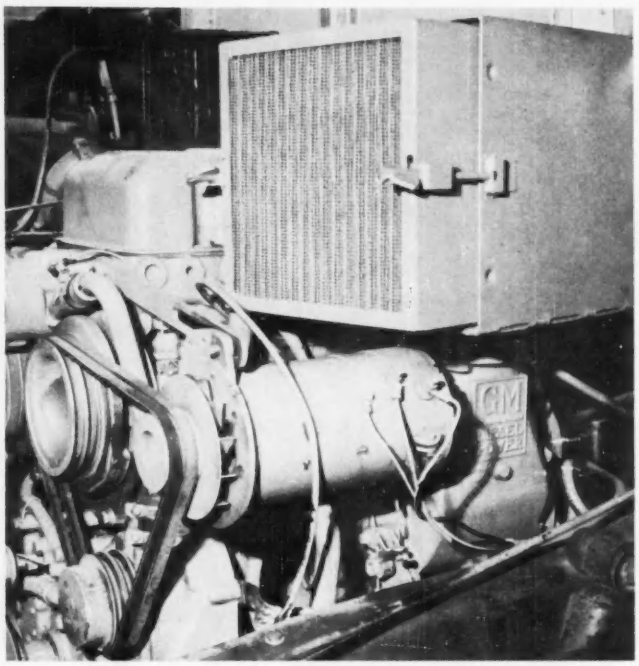
A combination full-flow/by-pass lube oil filter is standard. The full-flow section takes all the oil from the pump and passes it to the engine. The by-pass section is constantly taking off a small amount of oil, passing it through an extremely fine filter and discharging it into the sump.

What Does it Mean . . .

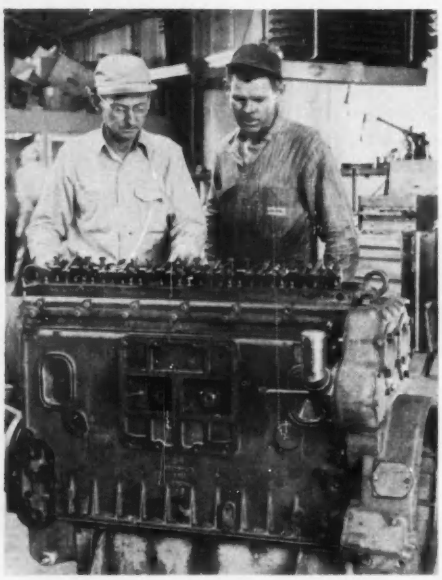
Mack's new END 673P engine retains the proven features of the Thermodyne with the advantages of increased power with no added complication. Since there is no appreciable increase in weight, the 10 "free" horses add to the attractiveness of the package.



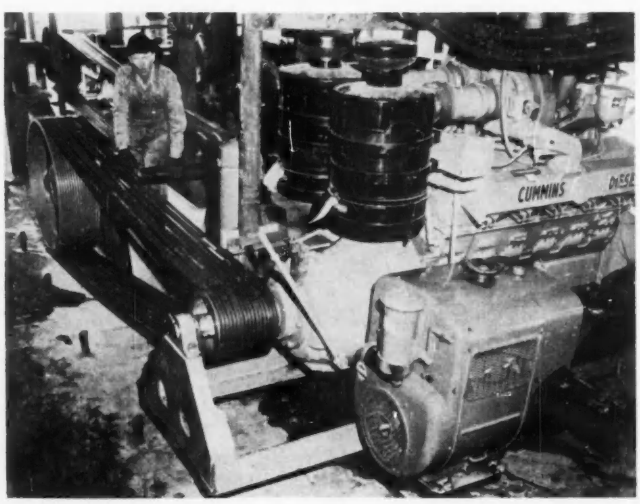
Tuned induction raises torque and horsepower curves throughout operating range.



Repowering Accessories
Repowering done by Diesel Service, Inc. placed a GM 3-53 in a Ford C700 for Adley Express. Farr dry-type air filter is fitted with Bacharach differential pressure gauge on rear-side of filter to show need for servicing.



Al Earnshaw's "Jimmys" Torn Down
Coastal Drilling's famous "jimmys," after 120,000 hours, have been torn down—not because of difficulties, but because the drilling rig has run out of work. Al Earnshaw (left) and mechanic Sam Gary take a look. The original Clevite bearings showed only modest wear. Looking at them, Al Earnshaw shouted "Good for another 25,000 hours."



V-Belting Solves a Problem
Pioneer Sand Co. changed from steam to diesel on their big barge, for balance placed engine 25-ft from sand pump. Gates Rubber Co. recommended Super H-C belts. Sixteen of these run from engine to jackshaft, and ten from jackshaft to pump. Saved space and weight. Belts take output from Cummins developing 410-hp.

John Deere "3010" Diesel Row-Crop Utility with integral or pickup plow.

JOHN DEERE DIESEL TRACTORS, IN "NEW GENERATION OF POWER," USE BENDIX FUEL INJECTION NOZZLES

John Deere's newest line of farm tractors, featuring what the company calls a "New Generation of Power," promises a brighter, more profitable future for farmers. To meet the special needs of large-acreage, row-crop farming, Deere has engineered its tractors for more complete control over work time and quality, operating cost, and physical effort.

Features designed to achieve these aims include: New multi-speed Synchro-Range transmission that "tailors" speed and power; demand-type hydraulic system that provides finger-tip equipment control, as well as supplying the power steering and power brakes—the latter a new John Deere "first"; new independent dual-speed power take-off for 540 and 1000 rpm equipment; scientifically designed posture seat.

John Deere builds both 4- and 6-cylinder variable speed engines, in gasoline, diesel and LP-Gas models. On its diesel-powered tractors, Deere uses Bendix® Fuel Nozzles for efficient, dependable diesel fuel injection, with maximum utility and minimum maintenance.

In greater and greater numbers, engine builders rely on Bendix for their needs in diesel fuel injection equipment. Users, too, are assured of continuing satisfaction through our nation-wide organization of distributors and service specialists. When you think of diesel fuel injection equipment, think of Bendix!

Scintilla Division
Sidney, New York

THE Bendix CORPORATION

Export Sales & Service: Bendix International Division, 205 East 42nd St., New York 17, N. Y.

For information write in No. 1019

The New Mercedes-Benz 190D

Bigger body and more powerful engine enhance the utilization capacity of this newest diesel-powered car

The new Mercedes-Benz 190D package is even more commercially profitable to operate than its predecessor. Upped in power and slightly larger in dimension, it overcomes these two objections that had been heard to its use. Now, the 190D, with more horsepower at higher rpm, has snappy performance through the gears and a top speed of 80-mph.

As a long term investment this ruggedly constructed automobile is hard to beat. On the basis of experience in taxi service both in Europe and in this country, it can be purchased on a long-term basis—100,000 or more miles before rebuild. Because of Mercedes' method of construction, maintenance, when it comes about, requires few man-hours and is therefore cheaper. Whole assemblies can be swapped-out if necessary.

For the commercial fleet operator and the taxi man, the added power and extra room increases the utilization capacity of the package. Safety factor is increased through good passing ability. In taxi service, the bigger body seats three comfortably in the rear with added

(continued on page 51)

Sub-frame makes "swap-out" easy.

Diesel Service Company, Inc., an ADS Member Shop, was visited in course of meeting. Portion shown is devoted to injection pump calibration.

ADS

ASSET TO DIESEL SERVICING

Association of Diesel Specialists meeting brings into focus continuing programs aimed at better service to the user.

ADS has just completed another successful meeting, this time in Minneapolis, Minn. As far as EQUIPMENT SUPERINTENDENT is concerned, we judge the success of such association meetings on the basis of their contribution to the industry as a whole. One ADS objective, stated in their "By-Laws" is "to promote . . . improvement of the diesel industry and the protection of its customers". How did it fill this bill?

One way that this is being done is through education. This is done both internally and externally. Those who attended from the some 170 members firms had opportunity to soak up technical information in the course of scheduled talks and manufacturer's seminars. All major manufacturers of injection equipment currently in use in this country and our neighbors (excluding engine builders with proprietary designs) conducted these service seminars.

These were attended by men from shops across the country—for example, Boston, Miami, New Orleans, Los Angeles, Seattle and points in between. An international flavor was added by a Canadian contingent headed by Fred Holmes, Fuel Injection Sales and Service, Ltd., Vancouver, Chairman of the Canadian General Committee, and Alfredo Christlieb, Sociedad Electro Mecanica, S.A., Mexico City, Chairman of the Central & South American General Committee.

This is indicative of the importance of ADS and through recognition of this, its growth. To get general and technical information into the hands of Latin-American technicians, Mr. Christlieb has undertaken a translation program. All this is an example of internal education, aimed at doing a better job for the customer.

External education takes several forms. Typical is establishment of job classifications. Many customers are apparently unaware that instructions to "fix it" or "overhaul it" mean different things to different people. Establishment of three job classifications, prominently spelled out on display cards at the point of customer contact, is making customers aware that there are different types of jobs that should command different prices. If the customer can "get it cheaper", what's he buying? It helps to know.

ADS' Board of Directors under President S. E. Franklin, Diesel Control Corp., Wilmington, Calif. has decided on one major meeting to be held in February of each year with an additional meeting in the fall. This will be solely a technical meeting and will rotate regionally. Guests are welcome, the only stipulation being that they be sponsored by a member.

Plus this, members are encouraged to conduct local seminars. Many have been doing this for some time, frequently drawing from as much as a 3-state area. These are schools by any definition at which both ADS technicians and customers get down to shirt-sleeves sessions. Fuel injection equipment manufacturers have cooperated generously in staging the educational diet.

ADS encourages 2-way communication between their organization and manufacturers of the products that they service and sell. Engine builders are at the top of the list. Some are contributing fuel injection service information regarding their specific engine in the interest of getting the best possible servicing in the field. One, Enterprise Engine & Machinery Corp., represented at the meeting by George Angers, has joined the association. They are the first but undoubtedly not the last as representatives of several engine builders have

George Anger, Enterprise, first engine builder to join ADS, addressed meeting. ADS officers, from left, are G. H. Hull, secretary; W. J. Connell, v-p; S. E. Franklin, pres.; V. J. D'Aversa, treasurer.

attended these meetings and are taking a long look.

Two other contributions to the industry as a whole are noteworthy. First, the Society of Automotive Engineers has been involved for some time in setting up standards dealing with fuel injection equipment. ADS has been invited to participate and in a series of meetings their representation has made solid contributions.

The second item concerns upgrading of the work in the individual member shops. Compilation of a substantial Service Information Manual, available only to member shops, is a step in this direction. Shops now have more and more accurate service information to enable them to do the job right. The second step is finalization of a test pump program.

Now, shops can get a test pump kit at a reasonable price. With this highly-accurate equipment, shops can periodically check their calibration stands to insure their accuracy. This is added assurance to the customer that the work done on these stands is done in accordance with the manufacturer's specifications on an accurate machine. Think about this when having your work done.

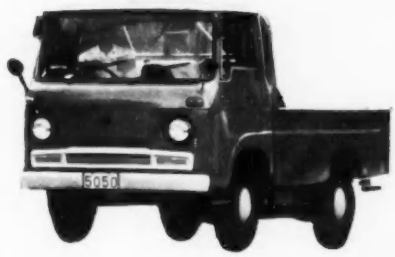
From this rundown of basic contribution to the industry as a whole, we must conclude that this was a successful meeting. It doesn't stop here; seeds were sown for progressive steps that we'll be reporting on in the future. In the meanwhile, if you want more information about this group, its aims and objectives, contact the Executive Director, Martin Fromm, at the Executive Offices, 633 East 63rd St., Kansas City 10, Mo.

One view of well-attended display area where 20 companies had exhibits.

Service seminars were popular part of program. C.A.V. personnel, from right, Dick Hedges, Tony Brooks and W. S. Dack (standing) conducted this particular one.

MULTI STOP

ISUZU DIESEL

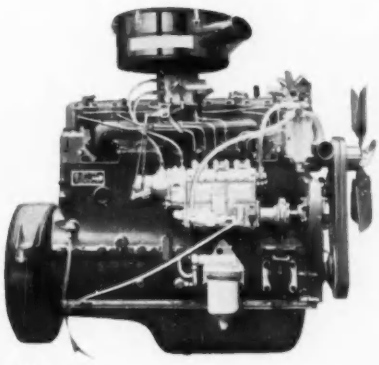


"ELF" Truck

BC Rear Engine Bus

Ever Rolling in the Direction of Progress

ISUZU Diesel engines have been cited abroad for their multi-stop driving capacity, extensive durability, excellent performance, low fuel cost and extremely low maintenance expenses. Advanced engineering techniques and skilled craftsmanship have boosted the international fame of Japan's oldest and largest Diesel manufacturer, ISUZU.



DA 120 Engine

ISUZU MOTORS LIMITED

Shinagawa-ku, Tokyo, Japan Cable: "ISUZU TOKYO"

Representative Office: 1237 South Figueroa St.
Los Angeles 15, California

MAIN PRODUCTS:

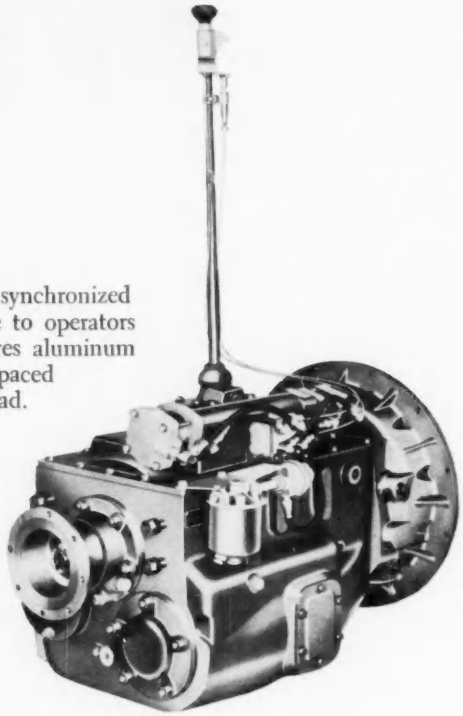
Buses.....Capacity 12 to 51 seats.
Trucks.....G.V.W. 8,500 to 31,000 Lbs.
(4 × 2, 4 × 4, 6 × 6, 6 × 4)

Various other special purpose vehicles, such as dump trucks, fire engines, tank lorries, garbage trucks, etc.

Diesel engines (52 to 230 HP) for mounting on marine boats, generators, industrial equipment and conversions.

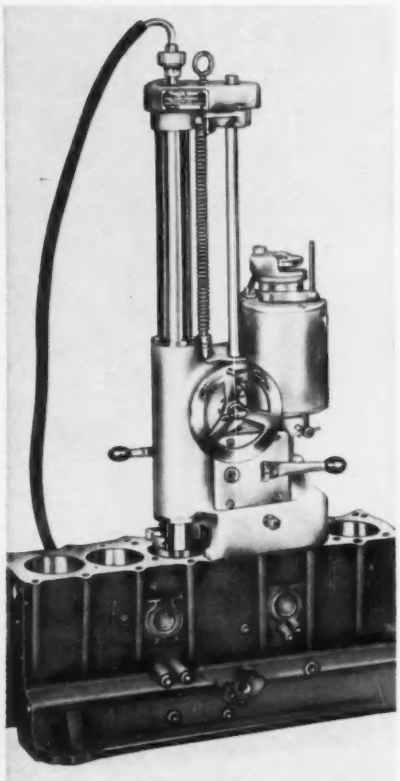
For information write in No. 1021

NEW PRODUCTS



12-Speed, Unsynchronized

Spicer's model 8125-U is an unsynchronized 12-speed transmission available to operators of heavy duty vehicles. Features aluminum case short in length. Evenly spaced ratios have 455-rpm gear spread.



Cylinder Borer

Good for some of the smaller unsleeved diesels, and for truing block bores before liner installation, Kwik-Way's model FW cylinder boring machine has a capacity of 2.2-in to 4.12-in, and an 11.25-in stroke and automatic retraction. Two speeds (380 and 620-rpm) are instantly changeable. This model is equipped for top-suction chip removal with Kwik-Way Vertex.

Fluorescent Detector

United States Casting Repair Corp. has announced development of a low-cost system for detecting surface cracks, flaws, defects and porosity in metallic and non-metallic solids. Seal-Lock Fluorescent Detector utilizes black light to activate highly-sensitive materials that make cracks appear as glowing lines. Portable one-man operation makes it suitable for field inspection as well as production work. Water-soluable materials are easily removed by rinsing.

Once again Perfect Circle Piston Rings are the overwhelming choice among winners of Fleet Owner magazine's annual Maintenance Efficiency Awards. And what is a better test of piston rings than daily fleet use? In an industry where costs are counted in mills per mile, there's little room for second-guessing. Only replacement parts of proved long-run dependability—equipment that will reduce operational costs and increase profits—are acceptable. That's why, year after year, the majority of award-winning fleets rely on PC rings for greater efficiency on the road—less down time in the shop—and more black ink in the books. Here's real proof of Perfect Circle's superior performance.

EXCLUSIVE PERFECT CIRCLE USERS AMONG 1961 M.E. AWARD WINNERS • ANDERSON HAULAGE COMPANY, COLUMBUS, OHIO • ARROW COACH LINES, BROWNWOOD, TEXAS • D.C. TRANSIT SYSTEM, INC., WASHINGTON, D.C. • GARY TRANSIT, INC., GARY, INDIANA • GEO. A. HORMEL & COMPANY, FORT DODGE, IOWA • HARRISBURG RAILWAYS COMPANY, HARRISBURG, PENNSYLVANIA • KANSAS CITY TRANSIT, INC., KANSAS CITY, MISSOURI • LOUISVILLE TRANSIT COMPANY, LOUISVILLE, KENTUCKY • ROSE CITY TRANSIT COMPANY, PORTLAND, OREGON • THE CONNECTICUT CO., NEW HAVEN, CONNECTICUT • THE E. KAHNS SONS CO., CINCINNATI, OHIO • WASHINGTON, VIRGINIA, & MARYLAND COACH CO., ARLINGTON, VIRGINIA

PERFECT CIRCLE ...*The Rings The "Pros" Prefer!*

PISTON RINGS • POWER SERVICE PRODUCTS
HAGERSTOWN, INDIANA • DON MILLS, ONTARIO, CANADA

For information write in No. 1022

Engine Starting Primer

Start Pilot Corporation has developed a new engine starting primer, model 962. This capsule-type primer is sold as an inexpensive yet very effective starting aid,

permitting two or three starts per capsule. This depends on engine type and size. It is now being installed either as standard equipment or upon customer request by P & H, Onan, Massey-Ferguson, Witte, Joy and others.

1073

Prime Power Source Generator Set

A prime power source especially for mobile electronic applications has been introduced by Consolidated Diesel Electric Corp. Powered by a lightweight air-cooled American M.A.R.C. AC2 13-hp @ 2000-rpm diesel engine, the package delivers all voltages normally associated with electronic equipment. Single generator is designed by Lima Electric Motor Co., a sister company. Package consists of engine, generator. and control panel mounted on an aluminum base. Weight: 1100-lbs. It delivers 4-kw DC; 6-kw 400-cycle AC; 6-kw 60-cycle AC; or any combination of the voltages not exceeding a total of 7.5-kw. 400-cycle AC is 3-phase 2-wire; 60-cycle is 3-phase 4-wire. Both are rated at 80% power factor.

1074

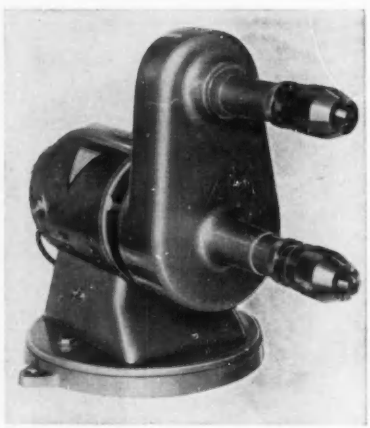
RPM Recorder

A visible rpm speed recorder, designed for use on off-highway equipment and over-the-road trucks is manufactured by the Service Recorder Co. The existing drive cable connects directly to the base of the recorder. In addition to recording the actual rpm by one stylus on a wax-coated chart, it also records engine idling time. A second stylus marks working and idle time. A spring-loaded visual pointer operates independently of the styli, which makes tamper-proof records even though the pointer should happen to be blocked. Also, shows rpm at a glance, reducing incidents of lugging and overdriving. These models have an amber warning light against overdriving; a red warning light against lugging. Rpm range setting are pre-set, but adjustable.

1076

Faster Injection Lapping Process

A new and faster lapping process is claimed by Leslie Hartridge, Ltd. New process reduces time required by 50%. Principle element in the process is the Hartridge Rapidlap, a nozzle lapping machine with a specially designed lapping



head to produce absolute concentricity. Handles both small and large nozzles up to "U" and "V" size, has high and medium speed spindles, is mounted on rotatable base. Pintle nozzels can be serviced as well as all other types. Steel laps are provided in sets of three, together with the special lapping compound.

1077

Radio-Telemetry Tach

Unilectron, Inc. has announced the "Thor" power meter designed to measure continuously, by means of radio-telemetry, readings of shaft horsepower. The 3½-lb unit is mounted directly on the shaft and transmits a reading to a remote location without wires, slip rings or other physical connections between rotating equipment and other stationary equipment. A three-channel system is also available if a separate and direct indication of torque and rpm is desired.

1078

Stop Light Switches

A new series of stop light switches for air brake equipped trucks has been announced by Velvac, Inc. The new 57A series are designed to put on the brake lights at less than 2-psi air pressure, giving long advance warning. Designed for long life in heavy duty service, these switches retain the best features of older model switches, with the additional benefits of newly developed materials and designs. Made to withstand winter-road salt erosion.

1079

Inhibited Descalant

Oakite 132 is a new inhibited scale and oxide remover introduced by Oakite. Used in closed systems, solutions of the compound may be heated to 180°F for faster descaling and derusting. Remains stable at high temperature, has tolerance for sulphur dioxide and ferric ions; reduces the hazard of copper ions depositing on steel; has a degree of inhibition in the vapor stage of the solution; has good rinsability with either hot water or cold.

1080

Re-Manufactured Pistons for Locomotives

A line of remanufactured pistons for railroad diesel engine repair is being offered by Ohio Piston Corporation. These are forged aluminum, oil-cooled, incorporate a cast aluminum ring carrier with an integral Ni-Life insert cast into the top ring groove. All-aluminum or bi-metallic banded pistons removed from service by railroads can be re-manufactured by Ohio under rigid control procedure. Production-line conditions keep costs low.

1081

Use your **es** *Reader Service Card.*

these cards will bring you more information!

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For Additional Detailed Product Information

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October, 1961
(Use before November 30, 1961)

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Are you responsible for the mechanical performance or maintenance of your company's mechanical equipment? ☐ Yes. ☐ No.

Do you have a voice in the selection of this equipment? ☐ Yes. ☐ No.

Please check any or all boxes if they apply.

My company operates:
☐ Construction Equipment.
☐ Off highway trucks.
☐ On highway trucks; buses.
☐ Industrial or stationary engines and equipment.

1 Simply note the numbers under advertisements and editorial items which interest you.

2 Then, write the numbers in the boxes on the card.

3 Fill in your name and address. Check off your job function.

4 Mail the card. We will pay postage and see that the information you requested is sent to you.

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TITLE _____
FIRM _____
TYPE OF BUSINESS _____
STREET ADDRESS _____ This is my home address ☐ Office address ☐
CITY _____ ZONE _____ STATE _____

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October, 1961
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PLEASE PRINT READERS' SERVICE NUMBERS HERE

NAME_____ TITLE_____
COMPANY OR ORGANIZATION_____

STREET_____ CITY_____ ZONE_____ STATE_____

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Western's Fleets . . .

(Continued from page 33)

our convictions. Now we are not only saving the money and time formerly wasted on unnecessary bearing boring, we're also eliminating the problems of proper timing gear clearance that results from the line boring of bearings."

Uneven compression ratios and valve clearances inspired research that resulted in a new shop tool and elimination of some other common engine problems. WMT noted that many engine rebuilders were using the "horizon" method for resurfacing engine blocks. They would find the lowest part of the machined surface, then grind everything else down accordingly. Seldom was this done with reference to the shaft. The result: the block invariably tapers in one direction or another. Runo found the difference between the front and rear of the block, in reference to the shaft, to be as much as 0.015".

A "pogo stick" gauge, fabricated from a gauge dial mounted atop an elongated injector tube, permits accurate measurement of the distance between the shaft and the top of the block. This small tool is used to determine when blocks need resurfacing, and to check the accuracy of the resurfacing when they come back to the WMT shop.

Mechanic's Ideas Are Good . . .

Runo emphasizes that keeping repair shop research on the move is no problem. It's part of the day's work for each mechanic.

This is certainly the biggest payoff of all to Western Milk Transport. The boring machine, the solution to the wheel difficulties, reducing the amount of line boring needed, eliminating compression and the valve clearance discrepancies —these were all products of the imaginative efforts of the mechanics in the departments involved. What Gordon Runo did was create the atmosphere in which normal inventiveness and curiosity could operate unfettered by embarrassment.

Each of the maintenance and repair division's four departments has a "standup" desk surmounted by a book cabinet stocked with up-to-date reference, repair and parts catalogs relating to everything the department handles.

"No mechanic is anxious to barge into the boss's office to look up something on equipment he's supposed to be repairing," observes Runo. "For one thing, he doesn't want to interrupt his boss. For another, he doesn't want the boss to suspect his ignorance about a piece of equipment in his department."

The individual research files have dramatically solved the problem. The dog-eared reference books, pages smudged and creased, are evidence enough that this bit of psychological insight is a big part of the success of the WMT technique. It was from impromptu huddles of mechanics around these reference manuals that came the ideas that have put real significance behind the terms, "finicky maintenance", and "equipment longevity".

Mercedes 190D . . .

(continued from page 42)

legroom. There's plenty of space for luggage and plenty of power to move the heavy load. Wheelbase is 106.3-in. with an overall length of 186.5-in.—both up considerably from the previous model. And there are other changes, too.

More Powerful Engine . . .

The M-B 190D engine is an in-line four now rated 60-hp @ 4200-rpm. Basically the same engine as its predecessor, detail changes have increased its output. Bore has been increased slightly, the Robert Bosch "M" fuel injection pump has modified adjustments and the camshaft is "hotter." Compression ratio is 21:1; bore and stroke are 3.43-in x 3:29-in. Displacement is 127:27-cu in.

Coupled to the engine is a smooth-as-silk all-synchro 4-speed gearbox controlled by column shift. Speed range through the gears is 20-mph, 34-mph, 54-mph and up to top. Fourth gear is direct, with third just a short step down for passing or pulling a hill under load. Second is a longer step down, geared for rapid acceleration after full stop. First is primarily a starting and heavy pulling (snow) gear.

Improved Suspension . . .

Ride of the 190D is very comfortable without detracting from the handling characteristics. This is accomplished through improving on a 4-wheel independent suspension system that was already very good. Mercedes' practice is to make front and rear suspension systems as precision-fit metal-to-metal units, cushioning road shock by insulating assemblies from the body. Precise fit provides precise control and long life.

Rear suspension is the same single-joint low-point swing axle that provides such excellent bad-weather traction; but a new compensating spring has been added to this model. It acts to stabilize the body, effectively reducing "roll" and "rear-end steer" without stiffening ride.

For the fleet operator, it is interesting to note that sub-frame construction is used forward. A single detachable sub-assembly carries the engine, gearbox and front suspension. It can be pulled as a unit, making for quick swap-out and easy service if needed. Rear suspension can be pulled as a unit, too.

Summary . . .

Mercedes 190D is a good long-term investment property. Rugged and reliable, its low maintenance factor, easy serviceability and low fuel consumption are attractive. M-B estimates 30.9-mpg, and in-traffic work should shave very little off the average. Diesels idle cheaply, and the more they're used the faster they pay off their initial cost premium. From there on, it's all profit.

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DISTRIBUTOR DOINGS . . .

Ex VP Heads Own Firm

F. H. Harris, who recently resigned as vice president—sales, Engine Parts Division, Gould-National Batteries, Inc., will now actively head his own automotive battery and engine parts firm, Battery & Parts Warehouse, Inc., in Memphis. It will distribute the Gould-National batteryline, and will warehouse complete stocks of Pedrick piston rings, Superior-Arrowhead engine parts and filters, as well as allied parts.

Purchase Diesel Service

O. M. Gilcrease, Jr. and Wilbur H. Feil have purchased Womack Bros. Diesel Service, San Antonio. all experienced personnel were retained. New firm, still at same location, is called Gilcrease-Feil Diesel Service. Firm is sales & service dealer for American Bosch, Bendix, Roosa-Master, Simms, C.A.V. and Robert Bosch.

New AMH Distributors

Atlantic Metal Hose Co. announces appointment of the following distributors to stock and sell their line:

Haverstick & Co., Inc., Rochester, New York;

John Bridge Sons, Chester, Pa.;

Acme-Mitchell, Milwaukee, Wis.;

Globe Rubber Works, Inc., North Quincy, Mass.;

W. H. Steingerwald, Co., Houston, Texas;

Wm. H. Taylor Co., Allentown, Pennsylvania.

New A-C Distributor

Allied Diesel Sales and Service of Boston has been appointed a distributor for Allis-Chalmers rotary compressors. They serve the states of Rhode Island, New Hampshire and Massachusetts (excluding Berkshire, Hampshire, Franklin and Hampden counties).

H. O. Penn Names Engineer

H. O. Penn Machinery Co., distributor of Caterpillar diesel engines in New York and Connecticut, has appointed Henry R. Killian, Jr. as Office Engineer for the engine division.

S & S Handles Yanmar

Stewart & Stevenson Services, Inc. has been named Texas and Louisiana distributor for the Yanmar Diesel Engine Co. Ltd's line of lightweight industrial and marine engines. These are available in the 2 to 15-hp power range.

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NEW LITERATURE

Turbo Field Test Kit Literature

Alnor Instruments has issued a bulletin which describes the Alnor field test kit for turbocharger testing (*Equipment Superintendent, July '61*). This kit pinpoints the cause of troubles right in the engine, taking the guesswork out of service. It was developed along lines suggested by Schwitzer. Bulletin, incidentally, outlines Alnor's product line in related instrumentation.

1089

Reusable Fittings

Aeroquip's new "Iron Mike" line of detachable and reusable fitting for high pressure gas and liquid hose assemblies is described in a brochure, complete with all specs. Designed especially for industrial markets, these fittings are said to combine reusability and low-cost. Fits hose sizes from ¾-in. to 2-inch.

1090

Balanced-Opposed Engine Compressor Units

White has issued a 4-page bulletin on their line of balanced-opposed engine-compressor units for continuous heavy-duty service. Construction details are summarized, appropriately illustrated, with both dimension and specification tables.

1091

Catalog on Spring(s)

Associated Spring has issued a catalog to help users match required O.D., wire size, length and other specs to the specific job. Includes specifications and complete listings of more than 1500 sizes.

1092

Torqueing Facts

Alpha-Molykote is offering reprint of a two-part story "Friction as a Factor in Bolt Tensioning, Galling and Seizing". Includes typical thread lubrication problems and their solution. Dramatizes need for proper torqueing, suggests ways to help get it.

1093

On Automatic Controls

Synchro-Start's automatic controls catalog no. 6 contains complete data on the company's product line. Starting with a section on general information, it includes everything from the drawings to the prices on everything from full-automatic engine controls to auxiliary engine accessories.

1094

Comprehensive Hydraulic Hose Data Catalog

The Gates Rubber Co. has compiled a 16-page brochure that's loaded with information for over-the-road, off-highway and industrial users of hydraulic hoses. Contains drawings of ply-type hoses and couplings, and has a complete make-to-make interchange listing by part number for hoses and couplings. Contains specs on couplings, braided hose and adapter unions. Another chart shows resistance of hydraulic hoses to various chemicals. Another section gives a short course in proper installation, with pictures showing the right and the wrong ways. There's more, too, so use your readers service card.

1095

Aluminum Bearing Catalog

A completely-illustrated aluminum bearing catalog has been issued to all NAPA warehouses and jobbers, and is available to interested users or potential users, from Clevite Service. Catalog assists in selecting bearing replacements for all Caterpillar engines, whether construction, industrial or marine.

1096

Sleeve Bearing Line

Johnson Bronze has announced availability of a four-page color brochure (JBL-35) describing their complete custom-designed and standard stock sleeve bearings and bar stock line. Carries general descriptive plus specific information, along with info on Johnson's research lab and the company's technical services.

1097

Pic-A-Pump Catalog Covers A-C Expanded Line

Allis-Chalmers complete expanded pump line is described in a *big* 1008-page catalog just recently available. Engineering data are arranged for selection of centrifugal, axial or mixed flow pumps best suited to specific and individual applications. The information permits ready engineering of the pumping units and selection of the materials of construction needed. Catalog also includes parts listings and prices, and a 64-page data reference section on pumps, hydraulic design, and frequently used general tables and charts.

1098

Reefer Info

Arctic Traveler has prepared a number of illustrated pieces that show the features of their various lines of all-electric and mechanical refrigeration systems for trucks, trailers and route delivery vans. One piece in particular, the 8-page color brochure describing the Super Trailmaster, goes into detailed explanation of the all-electric system. All brochures are yours for the asking.

1099

Truck Stop Guide

There's no doubt that truckers know the best places to stop. But for the younger drivers Sinclair Refining Company is offering at no charge the 5th edition of their "Truck Stop Guide." Lists truck stops offering eating facilities, diesel fuel (and gasoline) and other services designated under each listing. Use the readers service card to eliminate the guess work for your drivers.

1100

Cost-Cutting Program

Pure Oil Company has published a 16-page brochure that not only lists their complete line of industrial lubricants, but also spells out a program to streamline industrial lubrication that will show up in the profit column. Pure's research laboratory has studied field needs, and shows how many firms have handled their entire lubrication problem with fewer lubricants, fewer man-hours, and in many cases do a better lubrication job. In addition, booklet tells of Pure's industrial lubrication counseling service, which is available to customers at no extra cost.

1101

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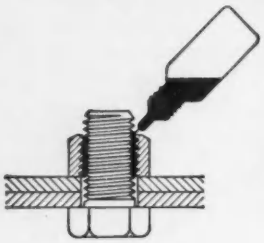

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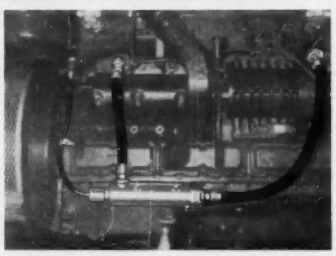

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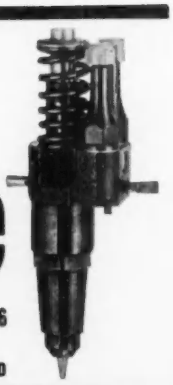

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